



**FACULTY OF HUMANITIES AND SOCIAL SCIENCES**

**SCHOOL OF EDUCATION, COMMUNICATION AND LANGUAGE SCIENCES**

**SCHOOL BUILDINGS MAINTENANCE IN MALAYSIA:**

**CURRENT PRACTICES, KEY CHALLENGES AND IMPLICATIONS**

**Abd Khalik Khassunah Muzir**

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**DECLARATION**

I hereby certify that this thesis is based on my original work except for quotations and citations, which have been duly acknowledged. I also declare that it has not been or is currently submitted for any other degree at the University of Newcastle or other institutions.

Name: Abd Khalik Khassunah Muzir

Signature:

Date:





## **Abstract**

The school building has been examined by various research dominated by quantitative approach originated from USA and Europe, which are keen to point out its influence on various learning outcomes. Nevertheless, the underlying factor which affects the building condition, namely school building maintenance receives scant consideration. Hence, the current study intends to fill this gap of knowledge on this under researched topic. Thus, drawing from multiple perspectives of key stakeholders' (i.e. education officers, school principals, teachers and students) experiences in four types of secondary schools in Malaysia, the research achieves the following: (a) examines the current policy, procedures and mechanism of maintenance in Malaysian secondary schools; (b) establishes the key challenges of school building maintenance in Malaysia; and (c) assesses the level of satisfaction of the administrators and end users on the school building condition and maintenance. Using mixed methods research, survey questionnaire and face-to-face semi-structured interviews were undertaken, besides walk-through observations of the schools and school documents review. Findings reveal the existence of school building maintenance policy, procedures and mechanisms in place, despite minor differences depending on school type. Key challenges include some common urgent school building maintenance issues, varying causes, limited resources and knowledge and skills, as well as critical roles of the different stakeholders. Findings also indicate that school building maintenance has implications for quality of education: school building condition; teaching and learning; and occupants' feelings and emotions. From the key findings, several recommendations in terms of policy and practice, which are of useful value for Malaysia and beyond, are offered. In conclusion, it is proposed that school building maintenance needs to be viewed from an ecological perspective, where schools are understood within their educational, social, cultural and geographical contexts.



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## Chapter 1. Introduction

The aim of this introductory chapter is to establish the background of the study so as to provide a perspective and thus understanding of the setting in which it is situated. This includes a brief overview of Malaysia in general, as well as other relevant information of its education system. This is followed by information related to the current study which includes: the problem statement; purpose and rationale of the study; research objectives; significances of the study; and the definitions of terms. Lastly, the thesis organisation is also outlined to give a clear indication of what is to be discussed within each chapter of this thesis.

### 1.1 Introduction

Education is regarded as '*the bedrock of the society and the engine room for social transformation*' (Brunold, 2005, p. 296) and one of the nation's most important enterprises (Filardo, 2008). A quality education is a life opportunity for children (de Souza Briggs and Wilson, 2006). Inevitably, education, which entails formal and informal learning as well as teaching, do not transpire in a vacuum but rather in an environment organised to facilitate learning (Asiabaka, 2008). Hence, in this context, one of the central aspects of any formal education system is the physical component - school building - the place where learning and teaching take place.

Nevertheless, a school building is not merely bricks and mortar assembled to provide a practical venue for learning (Kennedy, 2004). Its importance was highlighted by one early scholar who argued that '*if popular education be worth its great price, its home deserve something more than a passing thought*' (Robson, 1874, p. 2). Some argued that good infrastructure is the foundation of a quality education (Berner, 1993). Others posited that the school building plays a vital role in the actualisation of the educational goals and objectives by satisfying the students' physical and emotional needs. While the former are afforded by the provision of safe building structure, adequate sanitary facilities, appropriate thermal condition and sufficient space for work and play, the latter are met by pleasant surroundings, friendly atmosphere and stimulating environment created (Knezevich, 1975). The students, more likely than not,

need as many elements of good educational experience as possible, one of which is influenced by the quality of the physical setting in which students learn (Duke, 1998). Empirical research also seems to concur, as the following Chapter 2 will elaborate, suggesting that school building condition is to a certain extent significant in various outcomes like academic achievement (Cash, 1993a; Buckley *et al.*, 2004b), morale and commitment (Uline and Tschannen-Moran, 2008) to name but a few. Hence, for as long as '*the nation has not outgrown its needs for school*' (Goodlad, 1984), the school building would perhaps remain as a central component of the educational landscape.

As school facilities are fundamental to the teaching and learning process, similarly, school building maintenance is an integral part of the overall management of schools (Asiabaka, 2008). This is made more pivotal by the fact that the actualisation of the goals and objectives of education vis a vis meeting the students' physical and emotional needs mentioned earlier by Knezevich (1975), which essentially require the provision, maximum utilisation and appropriate management of the school facilities (Asiabaka, 2008). This is one of the primary concern being faced by many developed nations, like USA (US Department of Education, 2000a) and UK (Education Funding Agency, 2016), especially as they faced big challenges ahead with the current unfavourable conditions of their school assets due to past underinvestment in school building maintenance.

Therefore it is interesting to examine the issue of school building maintenance in the current Malaysian context, which itself aspires to be a developed nation by 2020 by undertaking a comprehensive transformation to its education system with the implementation of Malaysia Education Blueprint 2013 - 2025 to support such goal. Hence, the time is apt for the study in this particular issue as the findings would be of significant value in terms of providing a general overview of the current maintenance practices, key challenges and implications in the various types of secondary schools in Malaysia. Drawing from multiple perspectives of key stakeholders' experiences of school building maintenance on the ground, it is hoped that the findings could contribute to furthering our current knowledge and understanding of school buildings maintenance, thus informing future policy and best practice for a quality education.

## 1.2 Background of the study

In order to enhance the understanding of the current study, some essential background of the context in which the study is situated is necessary and is presented in the following sub-sections which include general information on Malaysia, its education system, types of secondary schools, legislative framework and key educational policy documents, administrative structure and finance. Besides that, the Malaysian school building history and specification as well as the need for school building maintenance were also presented.

### 1.2.1 General information on Malaysia

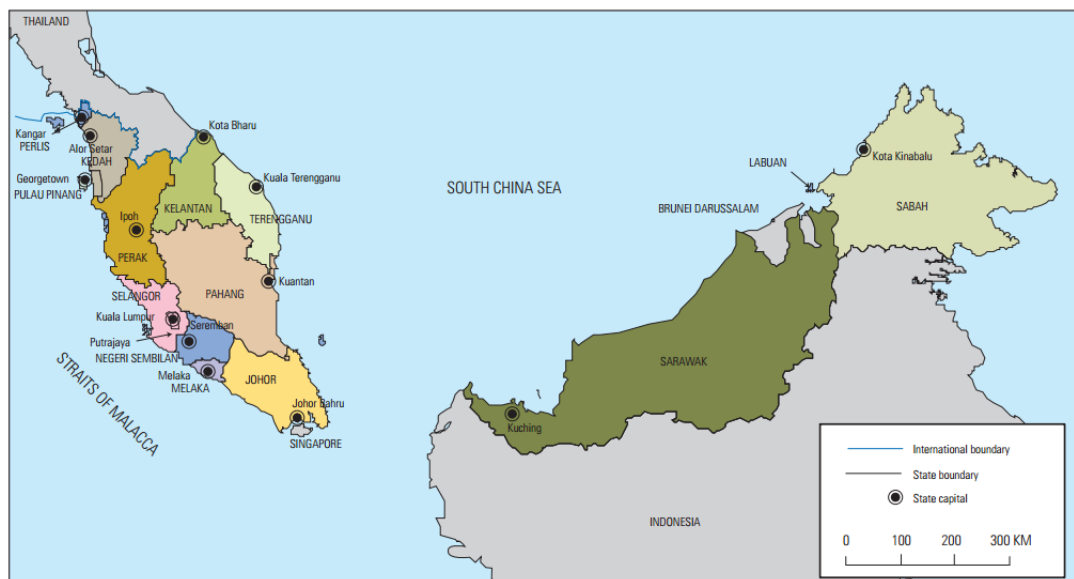


*Figure 1-1: Map of Malaysia (CDC, 2016)*

Malaysia is a nation which consists of Peninsular Malaysia and the states of Sabah and Sarawak located on the northern section of the Borneo Island, separated by the South China Sea, as shown in Figure 1-1. Malaysia is positioned between Thailand in the north and Singapore in the south, with the island of Sumatra Indonesia on its west (Suhaila and Jemain, 2007). The total land area of the country is 329,758 square km with Peninsular Malaysia (131,587 square km), Sabah (73,711 square km) and Sarawak (123,466 square km). Malaysia lies near the equator, within latitudes  $\frac{1}{2}^{\circ}$  and  $7^{\circ}$  N and longitudes  $100^{\circ}$  to  $119\frac{1}{2}^{\circ}$  (Wong *et al.*, 2009). With tropical rainforest climate, Malaysia is

warm and humid throughout the year with temperatures averaging around 27° Celsius, with average annual rainfall of around 250 cm (Suhaila *et al.*, 2010).

Once a British colony, Malaysia gained its national independence in 1957. Today, Malaysia is governed by a parliamentary constitutional monarchy, with the Prime Minister as the Head of Government and the King as Head of State (Ministry of Education Malaysia, 2008b). The Federation of Malaysia comprises of 13 states and 3 Federal Territories as shown in Figure 1-2. The states in the Peninsular are Perlis, Kedah, Perak, Penang, Kelantan, Terengganu, Pahang, Selangor, Negeri Sembilan, Malacca and Johor, while Sabah and Sarawak are located in the island of Borneo. Meanwhile, the Federal Territories are Kuala Lumpur, its capital city and Putrajaya, its federal administrative capital, both located in the Peninsular, while Federal Territory of Labuan is in the island of Borneo.



*Figure 1-2: States of Malaysia (Ministry of Education Malaysia, 2008b)*

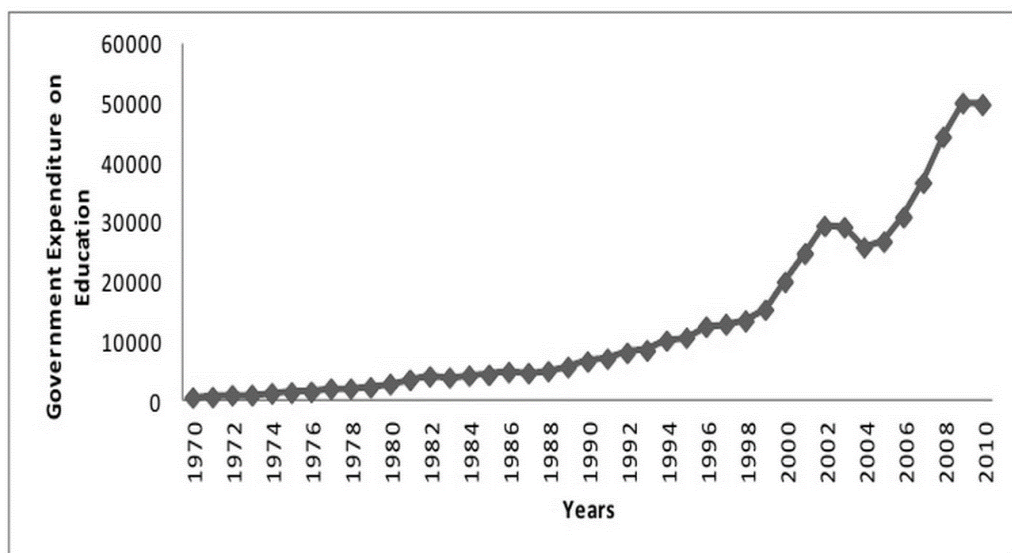
The Malaysian population is estimated to be around 30.1 million (Department of Statistic Malaysia, 2015). Characterised by its unique multi-ethnic communities, Malaysia is made up of three main ethnic groups. The majority 68% are ‘Bumiputeras’, which literally means ‘native of the soil’, comprising of the Malays and Orang Asli in Peninsular, as well as other indigenous people like Kadazandusuns, Muruts, Bajaus and others in Sabah, and Dayaks, Ibans, Penans and others in Sarawak (Lee, 1999). Another two major ethnic



communities are the Chinese at 24% and Indian at 7%, while the other ethnic groups represent the 1% balance (Ministry of Education Malaysia, 2015a). The national language is Malay but English is widely spoken. The former is also the official medium of instruction in school, while the latter is the second compulsory language to be taught and learn after Malay (Gaudart, 1987).

### 1.2.2 Education in Malaysia

As most developed and developing nations focus on the enhancement of education sector, Malaysia is no exception (Ibrahim and Awang, 2008). The government has always placed high importance on education in its national agenda as it is seen as vital in promoting national unity, social equity and economic development (Lee, 1999), especially in its aforesaid multicultural context. In addition, education is perceived as having a significant role to play in meeting the challenges ahead in realising the national aspiration of becoming a developed nation. At its core, the national guiding policy of national development which is outlined by the Vision 2020 underscores the role of its citizens as pivotal agent of the nation's economic growth and change. Hence, education is seen as a long-term investment critical to the realisation of the vision of a developed nation in the future (Malaysian Education Act, 1996).



*Figure 1-3: Government of Malaysia's expenditure in Million Ringgit Malaysia (MYR) for educational sector from total management and development expenses between 1970-2010 (Hussin et al., 2012)*

In practice, the Malaysian government's commitment towards developing its people as the ultimate resources towards this goal is epitomised by the sustained human capital investment via its education throughout the years. As demonstrated in Figure 1-3, there is an unremitting high level of investment by the federal government in education from 1970 to 2010 (Hussin *et al.*, 2012) which is consistent with this underlying philosophy. Their spending on primary and secondary education as a percentage of Gross Domestic Product (GDP) was the highest in East Asia as early as 1980s (Ministry of Education Malaysia, 2012c). In comparison to other countries within the region and GDP-equivalent countries in 2011, Malaysia is ranked among the top countries that allocate a high portion of its GDP at 16% for allocation on its education (Ministry of Education Malaysia, 2013a), which is around double the average expenditure spent by OECD countries as shown in Figure 1-4.

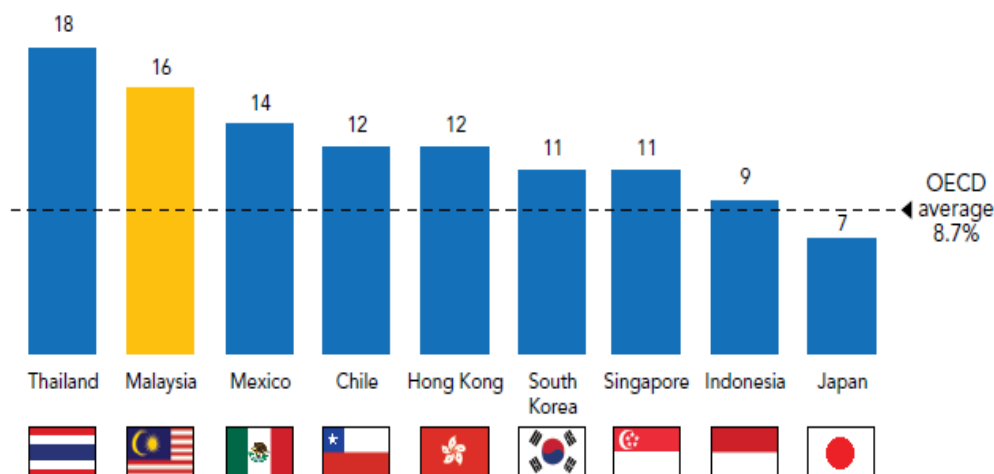


Figure 1-4: Basic education expenditure as percentage of government expenditure 2011 (Ministry of Education Malaysia, 2013a)

### 1.2.3 Legislative framework and key educational policy documents

The legislative framework which governs education in Malaysia consists of several Acts which essentially regulate the education quality and educational services provision and uphold the federal government commitment for the citizen to claim their constitutional rights to education.

The main overarching statutory provision governing Malaysian national education system is the Education Act of 1996, which states the purpose of education as ‘...to enable Malaysian society to have a command of knowledge,

*skills and values necessary in a world that is highly competitive and globalised, arising from the impact of rapid development in science, technology and information”* (Malaysian Education Act, 1996, p. 11). The Act stipulates that there shall be no discrimination against any citizen in the education system and that every religious group has the right to establish and maintain institutions for education in its own religion (Malaysian Education Act, 1996). It also specifies that the Government shall provide eleven years of free basic education from primary to upper secondary and that the Minister assumes the responsibility of providing secondary education in national secondary schools. Besides the Education Act 1996, other additional legislation related to education that need to be observed are as follows: The Special Education Act 1997; Child Act 2001; The National Policy on Disabled Child - Article 23 of Convention of the Rights of the Child (CRC), The National Policy on Indigenous Child - Article 30 of CRC; Persons with Disabilities Act 2008; and The Aboriginal Peoples Act 1954 (Ministry of Education Malaysia, 2015a).

With regards to the main policy document of education, it is encompassed in the Malaysia Education Blueprint (MEB) 2013 - 2025, which principally is the current national education master plan. It is the culmination of an education system review initiated in 2011. It started by evaluating the Malaysian educational system performance against international benchmarks and further reaffirms the vital role education plays in its national vision of becoming a developed nation in 2020 (Ministry of Education Malaysia, 2015b). The focus of MEB is to improve access to education, increase standards, close achievement gaps, strengthen unity and maximise efficiency (Ministry of Education Malaysia, 2015b). It offers a vision of education system and students that the nation requires and also outlines 11 core strategic and operational shifts that would be deployed to achieve such a vision (Ministry of Education Malaysia, 2015b), as shown in Appendix 1.

At the heart of the education system is its National Education Philosophy (NEP) which provides the overarching framework of Malaysian education (Ministry of Education Malaysia, 2008a). The NEP was established in 1988 in accordance with ‘*Rukun Negara*’ or the National Principles with the definitive aim of building a united and progressive Malaysian society (Ministry of Education Malaysia, 2001). There are 15 sub-elements of the NEP namely: (a) education is on-going

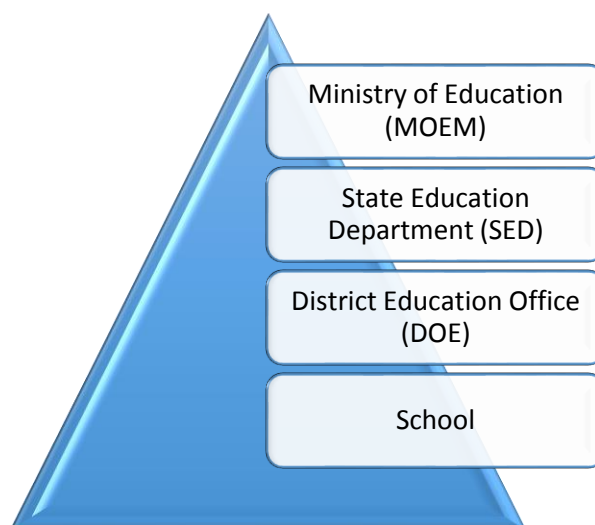
effort; (b) developing the potential of individuals; (c) developing the potential in a holistic and integrate manner; (d) a balanced and harmonious individual; (e) intellectual element; (f) spiritual element; (g) emotional element; (h) physical element; (i) firm belief in and devotion to God; (j) Malaysian citizens who are knowledgeable; (k) Malaysian citizens who are competent; (l) Malaysian citizens who possess high moral standards; (m) Malaysian citizens who are responsible; (n) Malaysian citizens who are capable of achieving a high level of personal well-being; and (o) Malaysian citizens who are able to contribute to the betterment of the family, society and nation (Ministry of Education Malaysia, 2001). These fundamental principles and goals are then translated into the Malaysian school curriculum, with the emphasis on the development of balanced, well-rounded, skilled individuals who value the aspiration of national unity (UNESCO, 2011b). Essentially, the NEP was founded on the basis of meeting the needs of the individual, family, society and country as a whole (Al-Hudawi *et al.*, 2014), while taking into account the multiple aspects of its religion, social composition, politics, economy, individuality and globalisation (Meng, 1996).

#### **1.2.4 Educational administrative structure**

Essentially, the education system in Malaysia is highly centralised (Ministry of Education Malaysia, 2015a). The education system is administered by four distinct levels of authority: federal, state, district and school as shown in Figure 1-5.

At the federal level, the Ministry of Education Malaysia (MOEM) assumes overall power and responsibility for developing policies and regulations concerning education (UNESCO, 2011a). At the state level, the State Education Department (SED), headed by the State Education Director, coordinates and monitors the implementation of national education programmes, projects and activities, consequently providing feedback to the MOE on overall planning (UNESCO, 2011a). At the district level, District Education Office (DEO) is essentially an extension of the SED (UNESCO, 2011b). Each DOE is led by the District Education Officer, who functions as integral link between the schools and the respective SEDs by coordinating and monitoring implementation of

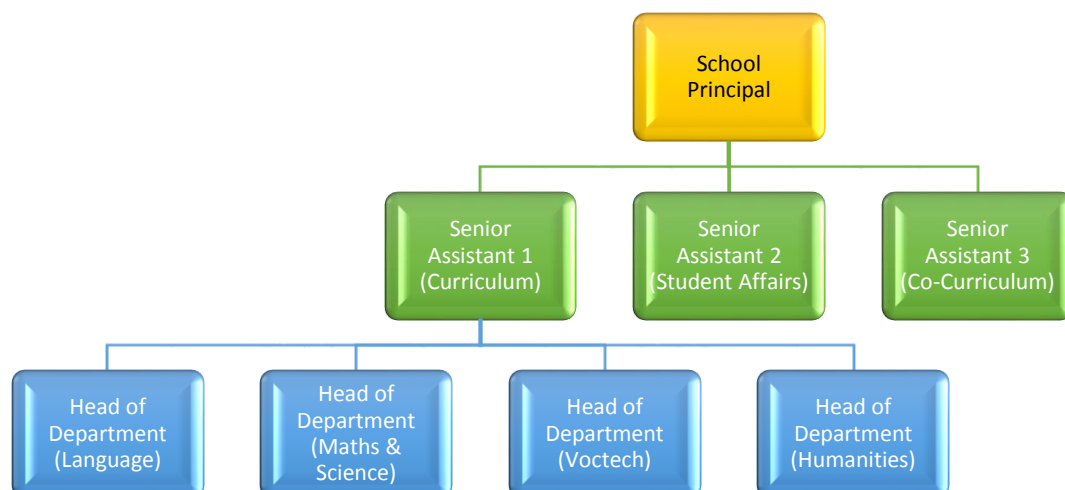
programmes, projects and activities at the grass-roots level, namely the schools (UNESCO, 2011b).



*Figure 1-5: Educational administrative structure in Malaysia*

There are currently 36 Divisions/Unit/agencies under the Ministry of Education Malaysia, supported by the 16 SEDs including three distinct education departments for the respective Federal Territories of Kuala Lumpur, Labuan and Putrajaya (Ministry of Education Malaysia, 2014). Meanwhile, at the district level, there are 139 DEOs nationwide (Ministry of Education Malaysia, 2014).

At the school level, the administrative structure is headed by the Headmaster or Headmistress at the primary school or Principal at the secondary school. Their principle responsibility is to provide professional and administrative leadership (UNESCO, 2011a). In most schools, the Headmaster or Principal are supported by mainly three Senior Assistants, each of whom is in charge of their own respective areas: Senior Assistant 1 (Academic); Senior Assistant (Student Affairs); and Senior Assistant (Co-Curriculum) as illustrated in Figure 1-6. For certain schools, where necessary, additional senior assistants are provided, namely Senior Assistant (Afternoon School Supervisor), Senior Assistant (Special Needs Education) and Senior Assistant (Sixth Form).



*Figure 1-6: Secondary school administrative structure in Malaysia*

### **1.2.5 Malaysian national education system**

With regards to the Malaysian national education system, it comprises of five levels: pre-school education; primary education; secondary education; post-secondary education; and tertiary education.

As illustrated in Appendix 2, the formal education commences with early childhood education for children aged between 4+ and 5+. This is succeeded by 11 years of compulsory primary and secondary education for every child in the country (Lee, 1999). With the official entry age of 6+, primary education follows for the child in the subsequent 6 years, until the age of 11+, which emphasises on the acquisition of strong reading and writing skills as well as solid foundation in science and mathematics (UNDP, 2005).

Next, the child proceeds to the secondary education which caters to children and adolescents between the ages of 12+ and 16+ years (Ministry of Education Malaysia, 2008a). At this stage, the secondary education is divided into two levels: 3 years of lower secondary education (Form 1 - 3) for 12+ to 14+ year olds; and 2 years of upper secondary education (Form 4 - 5) for 15+ to 16+ year olds (Ministry of Education Malaysia, 2008a). At the lower secondary level, only general academic programmes are available. Meanwhile both general academic and vocational programme options are offered in the upper

secondary, culminating in the students sitting for a common public examination called '*Sijil Pelajaran Malaysia*' (SPM) or Malaysian Certificate of Examination equivalent to the British GCSE 'O' level (Ministry of Education Malaysia, 2015a). After this, students can either continue to post-secondary education in Form 6 to acquire Malaysian Higher School Certificate of Examination similar to GCSE A Level, or enrol in other forms of tertiary education in higher public or private educational institutions like polytechnics, technical training institutes, colleges or universities.

### **1.2.6 Types of secondary schools**

As shown in Table 1-1, there are several types of secondary school in Malaysia, each of which is established to cater for a specific education program and needs as the subsequent sub-sections will elaborate. However, for the purpose of this study, only the four main types are emphasized due to its relevancy in the current study as well as their significant numbers in the overall Malaysian secondary education system, namely: national secondary; fully residential; technical/vocational; and religious schools.

<b>No.</b>	<b>Type</b>	<b>Total</b>
1.	National secondary (Regular)	1,964
2.	Fully residential	68
3.	Technical/Vocational	89
4.	Religious	93
5.	Special Education	5
6.	Special Model	11
7.	Sports	4
8.	Arts	3
9.	Government Aided Religious Schools (GARS)	164
	<b>Total</b>	<b>2,401</b>

*Table 1-1: Types of secondary schools in Malaysia (MOEM, 2016)*

#### *1.2.6.1 National Secondary Schools*

The national secondary schools are the most common type of secondary schools accounting more than half of total secondary schools in the country (Ministry of Education Malaysia, 2016b). They are aimed at catering for the needs of secondary education for the masses, exposing students to various generic fields in its curriculum. The administration of these schools are under their respective State Education Departments. Besides these national government schools, there are a small number of secondary schools that are called government aided or national-type schools. In these schools, the lands and buildings do not belong to the federal government, but they receive teachers supply and some form of support from the government. These schools, usually under the auspices of missionaries or other organisations, have their original roots in the early history of the country of English medium based education during British rule, like Victoria Institution (1893), St. John's Institution (1893) and Methodist Boys Secondary School (1897) in Kuala Lumpur (Ministry of Education Malaysia, 2008a). Each of these schools has its own Board of Governors, which essentially manages the school affairs.

#### *1.2.6.2 Fully residential secondary schools*

The fully residential school project was established as one of the intervention actions to the issue of high drop-out rates particularly among the rural students as pointed out by the report from The Committee on The Study of School and Society (Drop Out report) 1973, known as Murad report (Fatt, 1984; Hussin, 2002). The report found that the contributory factors of drop-out were poverty, the travelling distance to school and low quality transportation infrastructure (Hussin, 2002). As one solution to overcome these challenges, hostel facilities in daily schools were built to cater for children who live far away. In addition, the government also decided to establish the Fully Residential School programme especially to cater for gifted students, the majority of whom are from rural areas and low-income families, by providing a more conducive school and living environment to realise further their potentials (Fatt, 1984). They are selected based on their academic excellence, family income and location of residence (Hussin, 2002). Today, around 70% of its students are from rural areas (Yusof, 2006) and there are 68 fully residential schools located throughout the country



(Ministry of Education Malaysia, 2016b) under the auspices of Fully Residential and Cluster School Management Division.

#### *1.2.6.3 Technical/Vocational secondary schools*

The technical and vocational schools offer education at the upper secondary level. It is set up with the aims of preparing students to pursue a more technical, vocational and skills-based education (Ministry of Education Malaysia, 2008a). While the technical stream is geared towards preparing the students for higher education, with a solid foundation in technical and science subjects (UNESCO, 2011a), the vocational and skills based streams are more career oriented (Ministry of Education Malaysia, 2008a). With the recent educational policy changes of placing the vocational education in the education mainstream, the vocational schools have recently been upgraded into college status, offering diploma courses for three years for upper secondary students with ages of 15+ to 18+ (Ministry of Education Malaysia, 2015a). There are currently a total of 9 technical and 80 vocational schools nationwide (Ministry of Education Malaysia, 2016b) within the purview of Technical and Vocational Educational Division.

#### *1.2.6.4 Religious Secondary School*

The origins of these religious secondary schools can be traced with the take-over of 11 State Religious schools by the MOE in 1977 (Ministry of Education Malaysia, 2008a). These schools are established to prepare students for professions in Islamic religious affairs, education and law (Ministry of Education Malaysia, 2008a). Apart from academic subjects, their uniqueness are by offering specialised subjects like Islamic studies and Arabic language which are not available in other schools (Ministry of Education Malaysia, 2008a). There are currently 93 national religious secondary schools throughout the nation (Ministry of Education Malaysia, 2016b). While specific management like teachers supply is under the purview of Islamic Education Division, their physical development and finances needs are still under supervision of the respective State Education Department (SED).

### **1.2.7 Educational financing**

Primarily, education funds in Malaysia originate from the federal government (UNESCO, 2011a). Most schools receive their allocation via the '*financial warrant*' (Radzi *et al.*, 2013) directly from the Finance Division MOEM, except for remote rural schools whose allocation is managed by their respective State Education Department or District Education Office (UNESCO, 2011a).

The allocation for recurrent expenditure like wages and per-capita grant for school subjects and non-subjects, utility, school resource centre, hostel and guidance and counselling, is under the annual budget allocation (UNESCO, 2011a). It is within this annual budget that funds for maintenance are allocated under the Repetitive Operating Expenses (LPBT), although this lump sum allocation is also used for other purposes as explained further in the study findings. For financial accounting purposes, school buildings maintenance uses the following financial headings and reference codes: Maintenance and Minor Repairs (OS 28000); Building and Building Repairs (OS 32000) (Ministry of Finance Malaysia, 2004).

Meanwhile, the primary capital budget allocation for physical development, such as school buildings and infrastructure, is placed under '*Rancangan Malaysia*' or the Five-Year Malaysia Development Plan (Malaysia Plan) under the jurisdiction of the Economic Planning Unit (EPU), Prime Minister's Office. This capital expenditure is allocated to schools depending on the projects approved by EPU, and managed by the Development Division together with other relevant MOE Divisions and SED.

The School Construction, Upgrading and Maintenance Fund (TSCUMF) was also established in 2012 with the primary purpose of providing a special additional capital for financing the construction, improvement and maintenance of schools nationwide (Abdul Razak, 2011). As shown in Table 1-2, the government has injected a massive MYR 3.8 billion (GBP 676 million) for the special fund (Abdul Razak, 2011; Abdul Razak, 2012; Abdul Razak, 2013; Abdul Razak, 2014; Abdul Razak, 2015) to guarantee a safe and conducive learning environment in schools across the country (Abdul Razak, 2014).

School Type	TSCUM MOEM Fund (MYR Million)				
	2012	2013	2014	2015	2016
National schools	500	400	100	450	100
National type Chinese schools	100	100	50	50	50
National type Tamil schools	100	100	50	50	50
Mission schools	100	100	50	50	50
Government-aided Religious schools	100	100	50	50	50
Fully residential schools	-	100	50	50	50
Religious schools	-	-	50	50	50
Quranic schools	-	-	-	25	25
MARA Junior Science Colleges	100	100	50	50	50
National type Chinese Secondary Schools (Conforming)	-	-	-	25	25
<b>Total</b>	<b>1 billion (GBP 178 mil)</b>	<b>1 billion (GBP 178 mil)</b>	<b>450 mil (GBP 80 mil)</b>	<b>850 mil (GBP 151 mil)</b>	<b>500 mil (GBP 89 mil)</b>

*Table 1-2: The School Construction, Upgrading and Maintenance Fund MOEM*

### **1.2.8 School building history, design and specifications**

Historically, the school building construction and development in Malaysia was started by the local community and English missionaries prior to the nation's independence in 1957 with its respective English, Malay, Religious, Chinese and Tamil schools (Ministry of Education Malaysia, 2008a). Since independence, the task of school construction was later assumed by the federal government through the Ministry of Education (Noor, 1972). Until 1962, the Architectural Works Division of the Ministry either designed its own school projects or requested local consultant firms to undertake the work (Noor, 1972). After that, the Public Works Department (PWD), which was part of the Ministry of Works, Posts and Telecommunication, was given the responsibility of the design work and construction (Noor, 1972).

The establishment of a formal school building programmes was introduced in 1960 when the first Five-Year Plan, known as the First Malaya Plan was initiated (Noor, 1972). In the 8<sup>th</sup> Malaysia Plan (2001-2005), the government also initiated the Design and Build approach, where a private project consultant was appointed to lead some school building projects. Today, schools constructions are undertaken by a mixture of private contractors and PWD, all of which are under the auspice of the Development Division MOEM.

Nowadays, the school buildings in Malaysia are planned and designed according to the national education policy and curriculum (Economic Planning Unit, 2015). The main reference document currently used in all its school building projects by the MOEM is the Guideline and Regulation for Building Planning produced by the Economic Planning Unit (EPU). This guideline is primarily aimed at governing the design of educational buildings so as to be in consistent with the National Education Philosophy (Economic Planning Unit, 2015). The recent school buildings are in the form of a complex, consisted of several individual buildings which serve different functions in a single location, based on the classroom module format and standard norm of floor area as shown in Table 1-3 (Economic Planning Unit, 2015). The basic standard facilities and specifications of a secondary school provided in the guideline are outlined in Appendix 3.

No.	Item	Secondary school					
1.	No. of classroom module format	12	18	24	30	36	42
2.	Standard max. floor space per pupil (m <sup>2</sup> )	21.0	16.0	13.5	12.6	11.5	10.5
3.	Toilet (3.5 - 4.5 m <sup>2</sup> )	1 unit per 20 pupils					

*Table 1-3: Guidelines and Regulation for Building Planning (Economic Planning Unit, 2015)*

A typical school building in Malaysia is designed using an open concept where open or sometimes covered walkway provides a means of link between different and separate blocks as shown in Photo 1-1, while corridors and stairs connects

the classrooms within one block (Awang *et al.*, 2015) as demonstrated in Photo 1-2 from the observation of schools visited. Such concept is adopted so as to suit the country's equatorial climate where the weather is virtually constant all year long, consequently tapping to the natural lighting and natural ventilation provided by dominantly glass louvered windows (Awang *et al.*, 2015).



*Photo 1-1: A typical school building block with covered walkway (S13)*



*Photo 1-2: Corridors and stairs within a school block (S01)*

Under the previous Education Development Master Plan 2001 - 2010 within the 8<sup>th</sup> and 9<sup>th</sup> Malaysia Plans, the existing school facilities were upgraded and additional facilities were provided with the aim of increasing the intake capacity of the schools as well as enhancing the learning environment (Ministry of Education Malaysia, 2015a). In the preceding MEB 2015 - 2025, the MOEM acknowledges that the school infrastructure has a vital role to play in the creation of a conducive environment for learning (Ministry of Education Malaysia, 2013a). To this end, MOEM further reaffirms its commitment to continue the upgrading and maintaining basic infrastructure in schools in the blueprint so as to guarantee all schools are in good condition and attain basic infrastructure as shown in Figure 1-7 (Ministry of Education Malaysia, 2013a).

























Basic (2013-2015)	Baseline (2016-2020)	Future (2021-2025)
For all schools to at least achieve the <b>bare essentials required for a safe, hygienic and conducive</b> environment for teaching and learning	To provide the <b>minimum level of facilities to enable curriculum</b> and pedagogical delivery	To create an exciting environment for <b>21st century learning</b>
Requirements to be further tailored, based on school type (e.g. urban, rural, SKM, schools with hostels)		
 <b>Physical structure</b> (roof, walls, wiring, paint)	 <b>1 sporting facility</b>	 <b>Internet connectivity:</b> At least 10 Mbps for all schools
 <b>Classrooms</b> that meet ratio of 15-20 sq ft/student	 <b>24-hour Internet</b> access at speeds of at least 4-10 Mbps	 <b>1 device/student</b> at secondary level
 <b>Toilets</b> that meet ratio of 1 toilet bowl/ 50 students	 <b>At least 1 device for every 10 students in all schools</b>	 <b>At least 1 video conferencing facility</b> to support distance learning
 <b>12 hours electricity</b> , except for schools with hostels which require 24 hour supply	 <b>1 library/resource centre</b>	 <b>At least 1 advanced sports facility per state</b>
 <b>Treated water</b> , that is safe for drinking	 <b>Accessibility features</b> for the disabled, such as ramps and toilets	 <b>Further changes to school design may be required</b> based on requirements of new curriculum (e.g. specialist teaching room based on student grade and performance)
 <b>1 table and chair</b> per student	 <b>Designated places</b> for Islamic education activities	
 <b>1 workspace</b> per teacher	For secondary schools (subject to size of school):  <b>Science</b> (Biology, Chemistry and Physics) + <b>General Science labs</b>	
 <b>1 whiteboard or blackboard</b> per classroom	 <b>Living Skills workshops</b> (e.g. Home Economics, Agriculture)	
 <b>At least 1 ICT device for every 20 students in all schools</b>	 <b>Hostel for rural school students</b> who travel more than one hour to school daily	
 <b>Internet connectivity</b> at minimum speed of 2 Mbps		

Figure 1-7: School infrastructure requirement in MEB 2013-2015 (Ministry of Education Malaysia, 2013a)

### 1.2.9 The need for school building maintenance

As Malaysia progresses after its independence in 1957, its school building portfolio continues to surge. This growing trend of primary and secondary schools in Malaysia is shown in Figure 1-8 and Figure 1-9, which demonstrates the enormous challenge facing the nation in terms of managing the existing portfolio of schools at present.

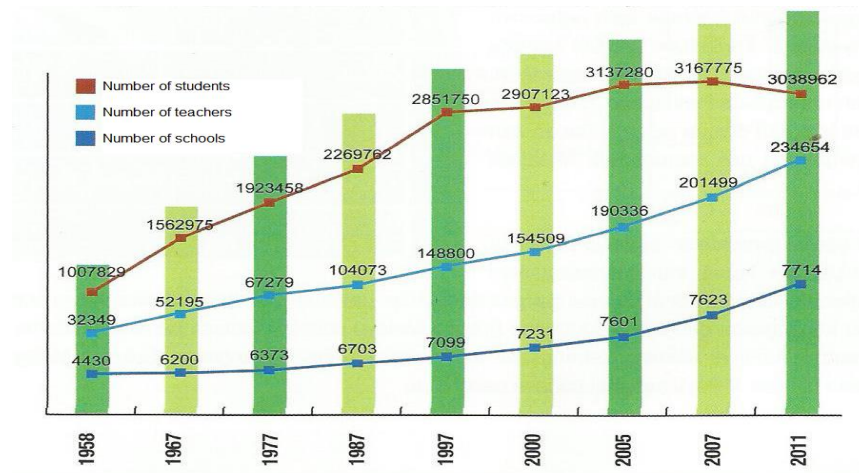


Figure 1-8: Primary school trends in Malaysia 1958-2011 (Ministry of Education Malaysia, 2012a)

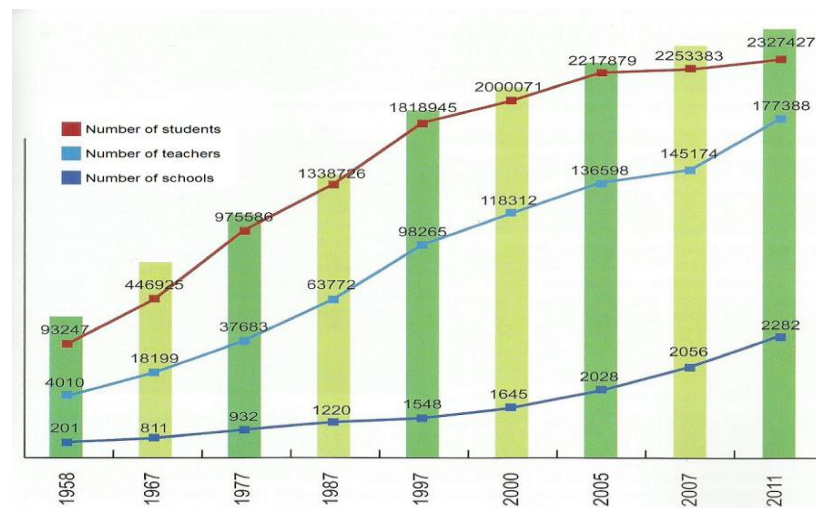


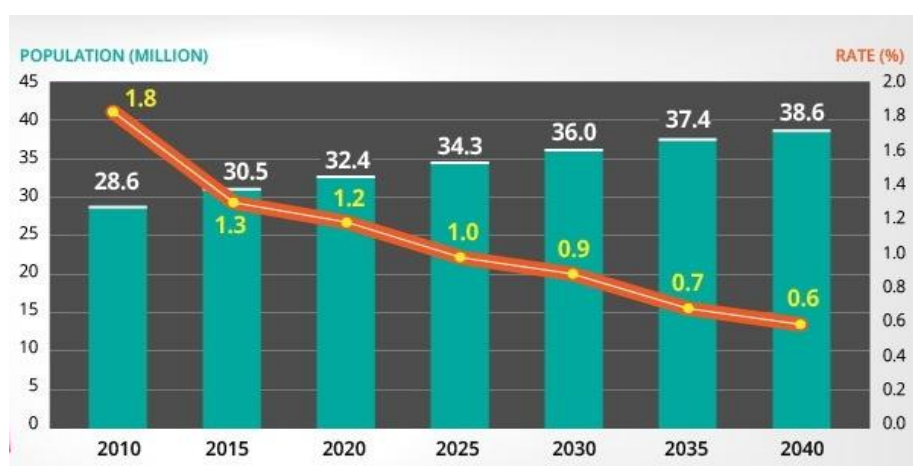
Figure 1-9: Secondary school trends in Malaysia 1958-2011 (Ministry of Education Malaysia, 2012a)

From the above mentioned trend, a significant number of new schools were added to the nation's public school inventory between 1958 and 2011. Since then, additional new primary and secondary schools were built to cater for the rising demand for education by more than 5 million children nationwide as the current statistics of Malaysian schools illustrates in Table 1-4.

Level	Schools	Students	Teachers
Primary (Inc. Preschool)	7,769	2,900,123	238,073
Secondary	2,404	2,220,679	181,747
Total	10,173	5,120,802	419,820

*Table 1-4: Malaysian education statistics (Ministry of Education Malaysia, 2016b)*

This is due to the fact that the enrolment rate increases at 3% per annum as the country has a substantial young population, with 30% from the 25 million of total population under the age of 14 years old in 2010 Census (Department of Statistic Malaysia, 2013). Current data suggests that a huge majority (70.5%) of Malaysians are between 15 to 64 years old, with under 14 accounting for 26%, and above 65 years old making up only 5.5% of the total population (Department of Statistic Malaysia, 2013).



*Figure 1-10: Malaysian Population Growth and Projection 2010-2040 (Department of Statistic Malaysia, 2013)*

As demonstrated in Figure 1-10, while the total population is expected to increase, the annual growth rate is projected to decrease from 1.8 in 2010 to 0.6 in 2040, caused primarily by the changing fertility patterns (Department of Statistic Malaysia, 2013). However, it is projected that the country will have a moderately young population in the coming years ahead at least for the next



decade, with those 0 - 14 age group accounting for 30.5% of the total population (UNESCAP, 2002). This implies that there is a continuous need to devote significant portion of the national development resources to cater for young generation of the population, with regards to their education (UNESCAP, 2002).

The national population upturn and its young population are not the sole driving force behind the increase in the number of new schools nationwide. In addition, throughout the years, particularly since its independence, changes in Malaysian Education policy and national development policy also continue to play a significant role which contributed to the increased construction of school infrastructure. Such educational policy changes range from increasing the national school enrolment by building more schools in rural areas (Report of the Razak Education Committee, 1956), addressing the drop-out rates of its children through Murad report (Noor, 1973) and expansion of the technical and vocational education since 1978 (Yusof, 2006) to name but a few. Similarly, the introduction of New Economic Policy (NEP) in 1970 to 1990 in the overarching national development policy of national unity aimed at the eradication of poverty and restructuring of society also contributed to this increase through its strategies of expediting the construction process of new schools in rural areas (Yusof, 2006).

Against these increased needs, the government is confronted with a continuous task of providing the essential educational infrastructure, namely schools. As the earlier trend shows, this has and will continue to be the primary challenge, with the need to build more new schools to accommodate the growing population vis-a-vis increased students' enrolment. In facing this enormous financial obligation with the ever increasing cost of building new schools, there is perhaps a similarly urgent and important point to remember about the growing stock of school buildings that the nation possesses, particularly their required maintenance. In other words, a balance needs to be struck between the need to construct new schools and to care for existing ones (UNESCO, 1984). After all, it is estimated that around 5,951 (78.3%) primary and 870 (42.9%) secondary schools are more than 30 years old, which is expected to necessitate high maintenance (Ministry of Education Malaysia, 2006). Hence, to enable these current public properties and future property investments to

function in a satisfactory and efficient manner, henceforth, adequate maintenance is critical (Louisiana State Department of Education, 1962). It is more of a concern as the government acknowledges the need to maximise every dollar and cent in terms of its investment as outlined by educational blueprint (Ministry of Education Malaysia, 2013a).

### **1.3 Statement of the problem**

The Malaysian education system is undergoing a transformation that is outlined in the MEB 2013 - 2025 with the overarching aim of providing high quality education to all students. In realising this aim, one of the main tasks identified is to ensure that 100% of its schools meet basic infrastructure requirements by 2015 in order to create a safe, healthy and conducive environment for learning regardless of location, size, or type. Thus, at the heart of the matter is school building maintenance. As such, this is not merely a technical or economical issue but also an educational priority. Therefore, this represent a valuable opportunity for the schools to be examined in relation to their current maintenance practices, its key challenges and implications so as to provide a better understanding of the school building maintenance issue in the national pursuit of attaining the desired school environment as envisioned in the educational blueprint.

### **1.4 Purpose of the study**

The purpose of the study is to explore the issue of school building maintenance in terms of its current maintenance practices, key challenges and implications in four aforementioned types of secondary schools in Malaysia namely, the national secondary, fully residential, vocational and religious schools. As the aim of providing a high quality of education *vis-a-vis* a safe, healthy and conducive environment for learning in Malaysian schools (Ministry of Education Malaysia, 2012c) is closely related to the way in which the school building maintenance is managed, hence the current policy, procedures and mechanism of maintenance in Malaysian schools need to be examined. Besides this, the key challenges of school building maintenance also needs to be established so as to better understand the issue further. In addition, the experiences of key stakeholder, namely end-users (students and teachers) as well its

administrators (education officers and school leaders) in relation to school building maintenance also require further consideration. Ultimately, the opinions of these stakeholders are also pivotal to assess whether the desired environment of safe, healthy and comfort as outlined in the Malaysia Education Blueprint 2013-2025 has been achieved in schools thus far. Hence, their satisfaction level on the school building condition and maintenance is also assessed.

### **1.5 Rationale of study**

Firstly, the area of school building maintenance is an under research topic in both internationally and locally. For a start, the school building management has long been neglected in professional literature and remains to be given scant thought (Kowalski, 2002). In addition, the educational physical setting, namely the school building, usually suffers the fate of being overlooked, as the debates of improving educational quality are undertaken (Sanoff, 2001; Sanoff, 2009). As such, the quality and condition of school facilities is considered one of the most ignored organisational factors in educational research (Duyar, 2010) and remains largely uncharted despite the huge investments involved (Baltas, 2005). Apart from that, the research on school building are undertaken mostly in the United States and other developed countries (Fisher, 2000; Higgins *et al.*, 2005; Woolner *et al.*, 2007), while there are only limited studies on school buildings in Malaysia (Hafni, 2003; Akasah and Amirudin, 2006). This study intends to fill this gap of knowledge by expanding the scope and increasing depth of the issue specifically to the secondary schools education context in Malaysia.

Secondly, while educational programmes are also vital, the school building itself, the venue in which people and programs meet, can support quality education or impede it (Filardo, 2002). Similarly, others argued that the '*physical facilities can positively support education*' (Hallak, 1997, p. 10). Past researches have shown that there is a connection between physical facilities to increased educational opportunity and achievement for students (McGuffey, 1982; Hallak, 1997) as well as teachers' satisfaction (Schneider, 2003; Ruszala, 2008), morale and turnover (Frazier, 1993; Buckley *et al.*, 2004a). In view of the current context and aforementioned past studies, there is a need to consider

how the schools are currently meeting this challenge of establishing a safe, healthy and comfortable environment in the Malaysian schools. At the crux of this challenge to attain the desired school environment as envisioned by the blueprint, lies the issue of school building maintenance, which needs to be examined in a greater detail, for which the current study aims to achieve.

Thirdly, the maintenance of school building research is necessary from an economic sustainability perspective too. This is because building and equipment account for the second largest portion of the educational budget after teachers' salaries (Hallak, 1997). In addition, as school building is long-term – often fifty years or more – community asset, therefore, maintenance and repair is one of the vital components of a long range facility plan for a school (Swartzendruber, 1996). While planning, design and construction of school building may take a few years, its management will last its entire life cycle. Hence, scholars from the early state-organised schooling have reminded us that there is a need to consider the respective economies of the initial expense for the school building construction and of perpetual financial outlay for its annual maintenance (Robson, 1874). Furthermore, research have shown that the portion of the cost of completion of a physical project (planning, construction, procurement etc.) is only around 20% of the life cycle cost (LCC), while most of the actual cost (80%) stem from maintenance, refurbishment and component replacements and others (Jabatan Kerja Raya, 2012). Most of the building materials as well as furnishings and equipment will not endure the test of time and will demand maintenance, repair and replacement (Lackney and Picus, 2005). Therefore, maintenance and repairs are inescapable realities which have been in presence for some time and would continue to be a significant funding issue in the foreseeable future (Berner, 1993). After all, building maintenance will remain as all buildings are subjected to vagaries of the weather, deterioration and use that necessitates continuous maintenance (Wood, 2009). The deferment of this critical decision would only postpone the cost temporarily in the short term, but it may lead to need a more extensive maintenance (Berner, 1993) and inevitably higher financial cost in future. It is only when the school building is properly maintained that its life span can often be prolonged indefinitely (Perkins, 2002).

Last but not least, the research on school building maintenance has also been a close subject of interest to the researcher professionally, as a former school teacher and former education planning officer at the Ministerial level. The latter experience of visiting many schools nationwide have sparked the interest further in researching this specific aspect of physical development and planning, particularly its important role in the context of offering quality education.

### **1.6 Research objectives**

The research objectives guiding the study are as follows:

- i. To examine the current policy, procedures and mechanisms of maintenance in Malaysian secondary schools;
- ii. To establish the key challenges of school building maintenance in Malaysia; and
- iii. To assess the level of satisfaction of administrators and end users on the school building condition and maintenance.

### **1.7 Significance of the study**

Firstly, the study is significant in terms of its potential contribution to the field of knowledge on school buildings and their maintenance, within and, importantly, beyond the local Malaysian context, which underpins the pursuit of providing a better quality school environment in future. After all, there is a great need to examine the various questions and problems associated with the physical school environment so as to help pave the way for the industry to perform '*a better job of providing good housing for students*' and inevitably over time has provided students the chance to go to school '*in improved surroundings*' (Earthman and Lemasters, 1997, p. 2).

Secondly, this study is also significant as it offers the multitudes of relevant stakeholders involved in the school buildings maintenance and will explore the expectations, understandings and experiences of education officers, school leaders, teachers and students. This is in contrast to past local research which has concentrated only on the state of school buildings in general from the perspective of the school administrators (Hafni, 2003; Akasah and Amirudin, 2006). This is also in line with suggestions from the past international research

to study the perceptions of school building condition by teachers and students and its consistency with perceptions of administrative personnel (Hines, 1996). Hence, this research offers a fresh viewpoint on the salient issue of school building maintenance with the combination of mixed respondents from different levels of the administrators and end users, allowing a broader view on the issue. Hence, the findings from these groups of respondents would offer a multitude of different perspectives on the topic of school maintenance, which would enable a more holistic and comprehensive understanding on the subject matter, thus adding to the available knowledge of school building maintenance and areas for future research in this field.

Thirdly, the significance of this study is in terms of its research methodology. Unlike previous research on school building which primarily is quantitative in nature, this study will be conducted using a mixed method approach consists of questionnaire surveys and semi-structured interviews. What sets the semi-structured interviews apart from others were the use of visual medium of school building maintenance photos, followed by a diamond rank activity session. In addition, personal visual observation of the school building condition was also conducted. Besides that, formal written documents such as maintenance records are also examined and analysed. All these would provide a wide-ranging wealth of primary data which is also rich and diverse, enabling possible data triangulation, offset, completeness and diversity of views to be performed and analysed (Bryman, 2008).

Fourthly, the proposed study is timely especially in the light of the transformation of the Malaysian education system that is currently in progress as outlined in the Malaysia Education Blueprint 2013-2025. With regards to the topic of school building and its maintenance planning, the focus of infrastructure as an integral aspect to support the overall plan is evident as mentioned in Shift 6 of the Malaysia Education Blueprint 2013-2025. In terms of its approach, the current study also shares a similar view of getting the information from the various important stakeholders of the education system, namely, the education officers, school principals and teachers as well as students. As it aims to explore the expectations, understandings and experiences of a multitude of stakeholders of the Malaysian education system, the study is expected to reveal some salient evidences and findings valuable in order to inform and stimulate

policy discussion as well as future policy and practice of school building maintenance, thus deciphering research into actionable advice (Baker and Bernstein, 2012).

### **1.8 Definition of terms**

The following are selected terminology that are employed consistently in this study:

School building is defined as the school building structure with its building subsystems and components that house and support the instructional program (Yielding, 1993).

School building condition is defined as the physical state of school building to guarantee safe and continuous operation (Bracknell Forest Council, 2012).

Building maintenance is defined as '*a combination of any actions required to retain an item in, or restore to, an acceptable condition*' (British Standards Institution, 1993). It is also defined as '*work undertaken in order to keep, store or improve every facility, its services and surrounds to a currently acceptable standards to sustain the utility and value of the facility*' (Chartered Institute of Building, 1990).

End users are defined as persons using the building (Mahgoub, 1999). In the case of the current research, these would be represented by the typical groups of school building end users, namely students and teachers (Leung and Fung, 2005).

Administrators are defined as persons that are tasked with the responsibility of educational administration. In the current study, two level of educational administration are included, namely at the State or Ministry and school level, represented by education officers and school leaders respectively.

### **1.9 Organisation of the study**

This dissertation is divided into six chapters. Chapter 1 includes an introduction, statement of the problem, purpose of the study, rationales and the guiding research objectives. In addition, the significance of the study, definitions used

and its organisation are also outlined. This is followed by Chapter 2, which presents a review of the related literature, both local and international, that are deemed pertinent to this study. The next Chapter 3 describes the research methodology that was used in the current study. The subsequent Chapter 4 presents the findings of the study, presented under major themes of maintenance practices, key challenges and implications. Chapter 5 contains the main discussion of the current study, drawn from key findings related to the research objectives with some practical recommendations. To conclude, the final Chapter 6 offers a summary, contributions and implications of the study, limitations, and recommendations for further studies.



## **Chapter 2. Literature Review**

In this particular chapter of the dissertation, the literature review is presented to position the study in relation to existing works with regards to the topic. It does not intend to summarise the available literature, but aims rather to reflect the growing interest in the area of the study through the trawl of existing literature on the topic of school building and maintenance. Due to the cross disciplinary nature of school building maintenance, this is reflected through the relevant materials from various disciplines: civil engineering, architecture, facilities management, asset management and property management, building maintenance and project management among others. Utilising the backdrop of such earlier research on building condition and education, this chapter would seek to establish the case for the importance of school building maintenance. Firstly, a general overview of school buildings is outlined. Then, the prior studies on school building and maintenance are introduced. Next, the subject of maintenance is then presented in terms of available definitions, reasons, purposes and types. Discussion on the rationales specifically for school buildings maintenance follows, and maintenance practices and challenges of school buildings maintenance are highlighted.

### **2.1 The school building: an overview**

To commence the chapter, an overview of what constitutes a school building is discussed. This is followed by cursory glance on some of its early development and how it is sometimes taken for granted by some quarters.

#### ***2.1.1 Components of a school building***

As a simple definition noted earlier in section 1.8, a school building is the school building structure which includes the building sub-systems and components that house and support the educational program (Yielding, 1993). To understand this further, an overview of what these represent is necessary.



*Photo 2-1: School building components (Photo from (Education Funding Agency, 2014)*

Similar to other buildings, a school building consists of two fundamental parts, namely the building envelope and building sub-systems (Lstiburek and Carmody, 1994) as shown in Photo 2-1. Firstly, the school building envelope consists of its foundation, walls, roof, ceiling, doors and windows, all of which combine to produce an enclosed space for teaching and learning as well as dividing the interior and its occupants from the exterior environment (Lstiburek and Carmody, 1994). Secondly, the school building sub-systems comprise of the electrical, plumbing and HVAC (heating, ventilating and air conditioning) systems which supply electricity and water to the building, as well as heats, cools and ventilates the aforementioned enclosed space (Lstiburek and Carmody, 1994). Sometimes, these '*working guts of the building*' are referred to as building services (Brand, 1995). Essentially, a school building is composed of various different but interrelated components and systems and its overall performance is a result of the combination of the following: the interaction between these components and systems; the interaction with its users; and maintenance practices (National Research Council, 2006).

### **2.1.2 Development of school building**

*In the beginning, there were no educational facilities at all.*

(Castaldi, 1994, p. 5)

As alluded to above by Castaldi (1994) where once there was no specific building for education, the school building has evolved throughout time to the modern building it is today as the one shown in Photo 2-1. During ancient times, as education was regarded as more of an informal activity, the physical setting in which learning and teaching were carried out was deemed inconsequential (Kowalski, 2002). Such views were exemplified by the open-air classrooms and temples in Greece to the veranda in the Roman era (Brubacher, 1947).

However, nowadays, in most cases, schooling occurs in buildings of their own (Rivlin and Weinstein, 1984). In contrast to the above mentioned Greek and Roman times, when schools were purely intended to be shelters (Kowalski, 2002), today's schools have evolved from just a setting of a learning environment to become a planned learning environment (Duke, 1998). From the early years of architectural dominance, the school building has given way to architectural, educational and environmental influence in its design. With the initial focus on lighting and ventilation as the central consideration, the development of the school building as a specialised institution has expanded. In recent decades, other aspects of the school building have aptly responded in meeting the need and advancement in pedagogy, technology and knowledge about environmental effects on learning (Kowalski, 2002). In most cases, schools of today are expected to have their own buildings in which to house all activities of an educational institution (Dash and Dash, 2008), which is '*modern, accessible, inviting, flexible, durable and efficient*' (Kowalski, 2002). The significance of a good school building as one of the basis of quality education is acknowledged as follows:

*Good infrastructure is truly at the base of a quality education.*

*For a society searching for ways to address the educational needs of the future, the building itself is a good start.*

(Berner, 1993, p. 28)

In these modern times, such an expectation is perhaps justifiable, based on the argument for the need to consider the importance of the physical environment in which education comes about, stemming from the fact that modern children spent significant hours of their lives in a school. Common sense dictates on the need to consider the setting of the classroom or the school buildings as vital not only to the process of teaching and learning but as the environments in which the children spend a substantial part of their life during a crucial phase of their development (Robertson and Gerber, 2000; Strickland and Hadjiyanni, 2013) after their home (Rivlin and Weinstein, 1984; Baker and Bernstein, 2012). It is estimated that they spend almost 30% of their life in schools and about 70% of their time in school inside the classroom during school days (Bakó-Biró *et al.*, 2012). While the school building is an essential place for children (Dutt, 2013), it is also worth bearing in mind that other stakeholders namely the principal, teachers and staff who makes up the school community spend a great deal of time in the very same school building (Lumpkin, 2013) as their daily official working environment (Castaldi, 1994). Thus, the school building not only serves as a physical venue for educational activities, but it supports a multitude of learning experience for students, as well as work experience for administrators, teachers and support staff (Castaldi, 1994).

As the education of the next generation is a serious need for every society, it is vital that the school environment is conducive for learning (Bello and Loftness, 2010). Some argued that the school building can either inhibit and thwart or enhance and support the educational program (Stenzler, 1988). Others posited that the school program could not be totally successful if the facilities are inadequate (Smith, 1984). For instance, a school with both students and teachers facing issues like noise, poor indoor quality, poor lighting and even physical security is unlikely to be conducive (Bello and Loftness, 2010) thus making it challenging for teachers to effectively teach and children to effectively learn (McColl and Malhoit, 2004).

### **2.1.3 Scant consideration of school building**

Nevertheless, the school building and its maintenance, more often than not, are often overlooked and taken for granted. It is argued that the management of existing school building is a subject that has been ignored even more than

planning in the professional literature, and continues to be one of the most overlooked areas of school administration (Kowalski, 2002). For decades the elements of successful educational program are debated, however, the psychical setting as an institutional backdrop suffers scant consideration (Sanoff, 2009). In most cases, when educational reform strategies to improve quality of education are discussed, the issue of improving the physical venue where teaching and learning occur is regularly overlooked (US Department of Education, 2000a; Sanoff, 2001; Sanoff, 2015). Instead the reform has emphasised on what is taught and how it is taught (Sanoff and Walden, 2012; Sanoff, 2015). Even so, there are those who argued that a broader array of issues needs to be considered in any education reform which includes the school building condition in order to increase or sustain achievement of students (Roberts *et al.*, 2008).

Such disregard on the importance of the school building perhaps stems from myopia of certain quarters, not through the fault of their own, but rather succumbing to the normality from which we predominantly view education. One could perhaps attest to such perception to certain extent, since human beings normally do not focus on a tool or an equipment, but more on the work in which they have become engaged, unless the tool or equipment become broken or inoperable, consequently shifting the focus towards the tool/equipment (Graham and Thrift, 2007). The same applies in the education context, whereby the focus of the human elements (teacher and student) and educational programmes are given more emphasis and attention, whereas the setting of the education vis-à-vis classroom or school building remains as an oblivious background. The school building is perceived, more often than not, merely as a support service or tool to house the educational programs. The focus of attention will perhaps shift to the setting when the school building began to leak and crumble, affecting the teaching and learning process. Consequently, only then, the importance of the school building and its maintenance in a grander scheme of things called education becomes clear – that school building is a vital tool for teaching and learning, and similar to any other tool, it can enhance or hinder the process (Sanoff and Walden, 2012).

In addition, the tendency of research in education which emphasises the human dimensions of the teaching and learning process further reinforced such limited

views on the importance of the school building. It is argued that educational research bestows a fairly strong focus on the human element (Duyar, 2010; Bengtsson, 2011), and cognitive activities of teaching and learning, and gives less attention to the material world (Bengtsson, 2011). Owing to the service-oriented nature of education, organisational settings and the contextual aspects that influence organisational behaviour receives little consideration among educational researchers (Duyar, 2010). As such, the quality and condition of educational facilities are deemed as one of the most neglected organisational factors in educational research (Duyar, 2010). Hence, despite its substantial investments, the appraisal of school buildings remains a largely unexplored field of research (Baltas, 2005). Nevertheless, there are research that have been undertaken with regards to the school building, some of which will be discussed the following section.

## **2.2 School building and education: the evidence base**

In order to set the context of the significance of school building maintenance, the review on related works is perhaps essential to fully understand and appreciate the range of empirical studies that have been conducted, which although did not specifically address the issue of maintenance, bear some direct or indirect significance and relations to the issue of this study. Their origins may not be from education, but rather it traverses a variety of other disciplines encompassing social and environmental psychology, architecture and engineering (Lackney, 1999a). To a certain extent, this also reflects the many diverse domains, trades and professions that are involved in providing school building and its facilities for students (Earthman and Lemasters, 1997).

### **2.2.1 School building and educational issues**

Research scholars have furthered our understanding of how the built environment affects education. There is a growing body of such literatures that offered some empirical evidence, on the link between students' behaviour and achievements as well as teachers' attitudes and performance with the school building. In relation to these studies, they could be divided primarily into two main strands of research, which are discussed below.

Firstly, it concerns specific elements of the physical environment. In this case, there is a myriad of research that examines the effect of physical elements which pointed to similar important components considered influential to the learning process: ventilation and thermal comfort (Haverinen-Shaughnessy *et al.*, 2011; Haverinen-Shaughnessy and Shaughnessy, 2015), lighting (Dunn *et al.*, 1985; Heschong Mahone Group, 1999), noise (Maxwell and Evans, 2000) and internal air quality (Smedje *et al.*, 1997; Smedje and Norback, 1999).

For instance, thermal comfort and classroom lighting are usually mentioned by teachers as one of the decisive factors of their morale and students' engagement (Corcoran, 1988; Jago and Tanner, 1999). It is also posited that temperature, heating and air quality are the most vital individual elements for students' achievement (Earthman, 2004). In the study of ventilation and thermal comfort in US schools, it is found that maintaining adequate classroom ventilation and thermal comfort could significantly improve students' academic achievement (Haverinen-Shaughnessy and Shaughnessy, 2015).

Lighting is also cited as another important aspect to students' achievement. In this case, a well-designed study on lighting by Heschong Mahone Group (1999) found that high levels of classroom daylighting demonstrated improved scores in math and reading tests. Various studies also pointed out that physical comfort correlates positively to students' concentration ability and school attendance as well as teacher retention (Lackney, 1999b).

With regards to noise in schools, previous research can be divided into two groups: the effect of external noise (airplanes and surface traffic); and the effect of internal noise (from daily activities of teachers and students) (Rivlin and Weinstein, 1984). In studies of the latter, it is found that there is a connection between the interior chronic noise level and pre-reading skills of pre-school children, whereby in the context of loud classrooms, their language use and understanding is poorer (Maxwell and Evans, 2000). In the context of the school building itself, old or substandard HVAC, electrical and plumbing systems can contribute to the amount of ambient noise in the classroom (Hatfield, 2011).

Apart from these elements, the internal air quality is another important factor as this could have some negative effects to health and safety of the school building users. For instance, the Sick Building Syndrome (SBS) and asthma are several

of the potential health hazards that have been identified in the school environment (Smedje *et al.*, 1997; Smedje and Norback, 1999). It is estimated that 10% of children suffer from asthma symptoms, which accounts for a quarter absence from school in Canada (Canadian Lung Association, 2002), and 10.1 million days school absenteeism in US annually (Taylor and Newacheck, 1992). In sum, the above mentioned studies are perhaps useful because they offer some insights into the psychological and physical dimensions afforded by the learning environment in the teaching and learning process.

Meanwhile, similar research with regards to school building in Malaysia is rather limited. Some examples of local research that were conducted in different parts of the country examined aspects like natural ventilation in school office buildings in Negeri Sembilan (Chan *et al.*, 2013), students' thermal comfort level in the secondary schools in Selangor (Daud *et al.*, 2015) and Malacca (Puteh *et al.*, 2012), school design and energy efficiency level in Perak (Mohd Salleh, 2008), as well as the indoor air quality in Terengganu (Ismail *et al.*, 2010). What this indicates is that the amount of local research undertaken within this aspect of the school building is still lacking and it is an area which could be encouraged in future.

Looking at this first strand of research, the most noticeable remark that could be made is on the tendency of this type of empirical research to focus on examining a specific individual environmental element like thermal condition, air quality and others in isolation. By doing so, it fails to take into account the potential interactions between the different elements. In addition, the differences of geographical and local factors also need to be taken into consideration. For instance, the level of heat tolerance deemed acceptable to one location does not necessarily means it is acceptable to another in a different location.

The second strand of research is focused more on the school building condition and education. A body of empirical research followed this line of thought, exploring the possible relationship between school building condition and teaching and learning. There is adequate research which supports the notion that the school building in which students learn does influence how well they do so (Earthman, 2004). This empirical work mainly originated from US (Fisher, 2000; Higgins *et al.*, 2005; Woolner *et al.*, 2007) and links student achievement



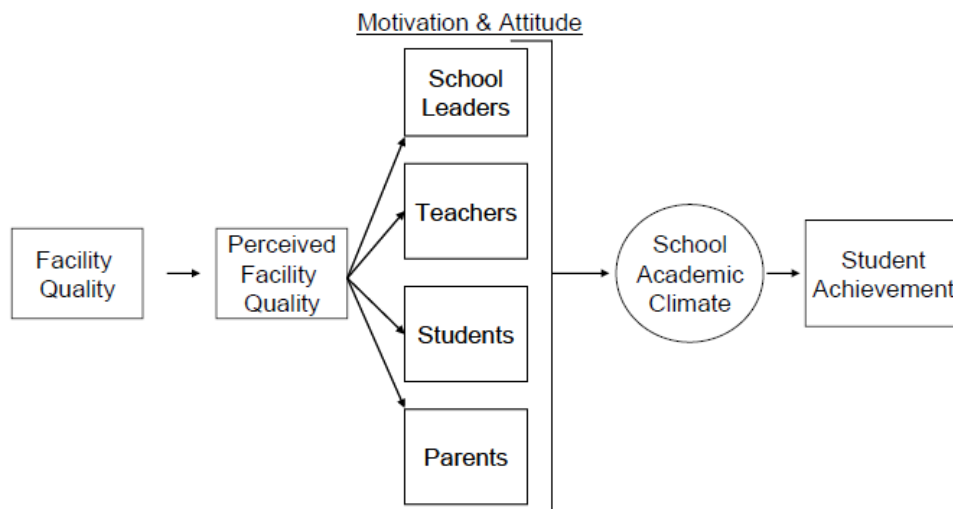
and behaviour to the physical building conditions. Such works on school environments extended our understanding by drawing from primarily quantitative approach, demonstrating connection between school building environment and student factors like learning (Earthman, 2004); academic achievement (McGuffey, 1982; Cash, 1993b; Picus *et al.*, 2005; Bullock, 2007; Blincoe, 2008; Crampton, 2009; Tanner, 2009); motivation (Schneider, 2002a); attitude (Fisher, 2000; Lackney, 2000; Earthman and Lemasters, 2009); self-esteem (Maxwell and Chmielewski, 2008); attention (Schneider, 2002a); attendance (Durán-Narucki, 2008; Kumar *et al.*, 2008); and dropout rates (Branham, 2004).

Besides student factors, research has also demonstrated that school building condition can have an impact on the teachers. Similar to students, the teachers also have the right to expect good physical working conditions in which their core responsibility – teaching – is made possible (Dykiel *et al.*, 2009). As teaching takes place mostly in a specific physical location, normally in a classroom within a school building, several studies have found that the quality of that location can also have an effect on the teacher's teaching ability, morale, health and safety (Frazier, 1993; Buckley *et al.*, 2004a), job satisfaction (Schneider, 2003; Ruzsala, 2008) and teacher retention when a host of other factors is controlled (Buckley *et al.*, 2004a).

While the research on school building discussed above is growing, similar research in the local context is few and far between. It is argued that published Malaysian research in this field is lacking (Mahli *et al.*, 2014). The ones that were available are more focused towards the technical aspects of the school building. For instance, there is one study which assessed the current physical building condition of 24 schools in the state of Sarawak by examining the number, component and type of building defects (Mahli *et al.*, 2014). Another similar study was conducted in Perak state which examined defects observed in four 100 year old school buildings (Alauddin *et al.*, 2016). One other study examined the types of decay and deterioration observed in mixed primary and secondary schools in Malaysia (Tan *et al.*, 2014). What is lacking in these studies are the connection of the school building condition and the teaching or learning process, which could perhaps be included.

### 2.2.2 School buildings condition as mediating factor

Other recent studies have suggested that the physical condition of school may not directly affect the students' academic performance, but rather operate through a mediated model. Earlier works linking the educators perception of their school facilities to achievement of the students (Uline and Tschannen-Moran, 2008; Earthman and Lemasters, 2009) offers the preliminary indication for such mediated models of school building condition as shown in Figure 2-1.

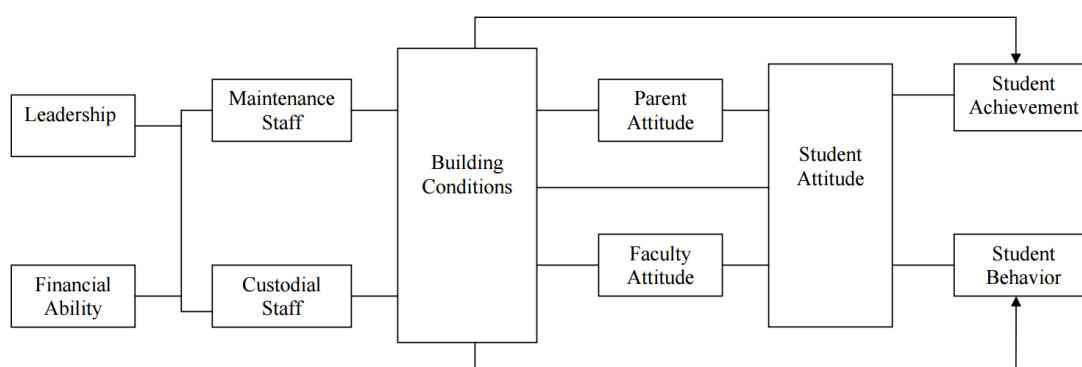


*Figure 2-1: Mediated model of school building condition and achievement (Bowers and Urick, 2011)*

Bowers and Urick (2011) in their extension of Picus *et al.* (2005) work, proposed such a mediated model as a potential next step for research in this area. In their model as shown above in Figure 2-1, it is posited that the school building quality directly affects the stakeholders' perception of their school building condition, which in turn influences their motivation and attitude on the school academic climate, consequently influencing students' achievement (Bowers and Urick, 2011).

Another theoretical model was developed by Cash (1993a) and has been used extensively by Hines (1996), Lemasters (1997), Lanham (1999), Al-Enezi (2002) and Earthman and Lemasters (2011) as shown in Figure 2-2. The main reason this model is deliberated upon among other various school building studies is because of its relevance to the current study. The model puts into perspective the issue of school building maintenance in an educational context

in a simplified form, which is deemed to serve as a useful theoretical perspective to better understand the issue and interplay of the school building maintenance, school building condition and its implications. However, it must be noted that it is not the researcher's intention to refer to the model in its entirety as a rigid framework in approaching the topic of the study, but rather it represents the best illustration available to better understand the position of school building maintenance and its relationship with building condition as well as other various elements of high importance within the education system.



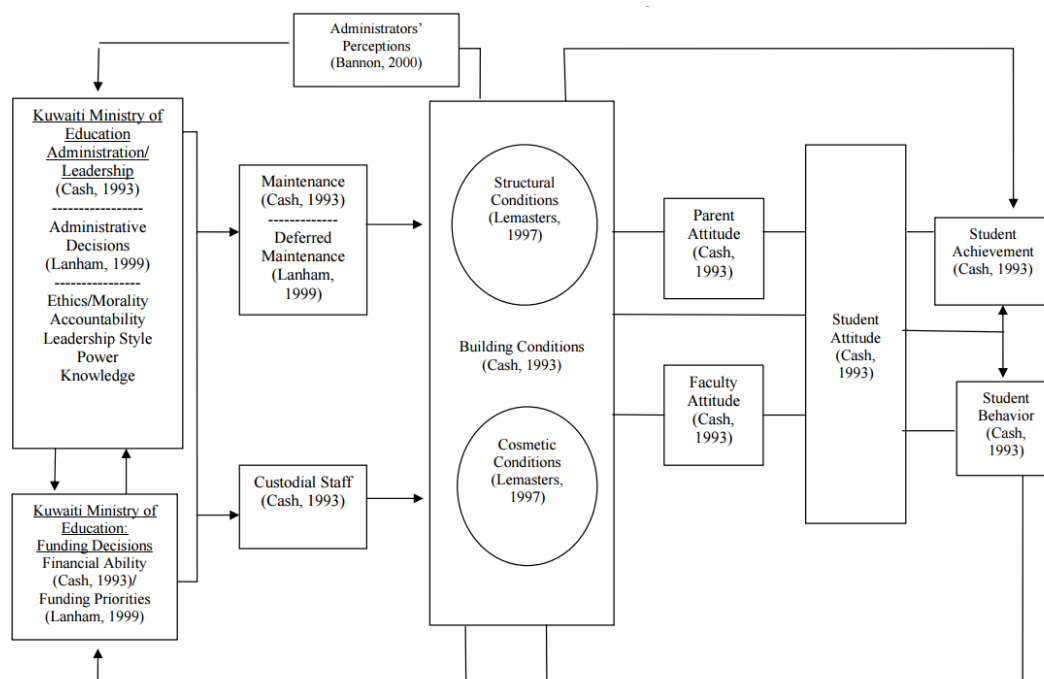
*Figure 2-2: Theoretical model of school building condition and student achievement and behaviour study (Cash, 1993a)*

As shown in Figure 2-2, the model posits that the first element that indirectly or directly affect the school building condition is leadership. The second element is the school finance. Both elements will have an influence on the school personnel (maintenance and custodial), with the leadership providing the vision to the personnel and funds to employ these personnel (Cash, 1993a; Hines, 1996). In addition, the elements of building age and quality of its materials also are external but equally influential factors. According to the model, it is found that as the building ages, the school building condition is closely linked to the works undertaken by the maintenance and custodial staff (Hines, 1996).

The model also proposes that the school building condition in turn affects three groups, namely parents, teachers and students, in a complicated relationship (Tanner and Lackney, 2006). With regards to the student, the school building both directly and indirectly affects the student's achievement and behaviour. In this case, the direct impact may be from illumination, acoustics, climate control and others (Hines, 1996). In turn, the student's attitudes about their school

building may not only affect their achievement and behaviour, but their achievement and behaviour may affect each other. Meanwhile, the indirect impact to both achievement and behaviour is via the student's attitude of the school building, which to a certain extent, may be influenced by their parents' or teachers' attitude towards the building.

Subsequently, this theoretical model by Cash (1993a) is further expanded and refined by many others (Lemasters, 1997; Lanham, 1999; Brannon, 2000; Al-Enezi, 2002) as shown in Figure 2-3. Firstly, Lemasters (1997) further sub-categorised building conditions into structural conditions (physical features like air-conditioning, presence of windows, lighting and locker condition) and cosmetic conditions (aesthetics aspects like recent painting, graffiti presence and cleanliness) based on his synthesis of several studies on school facilities including Cash (1993a) and Hines (1996) works.



*Figure 2-3: Expanded theoretical model of school building condition and student achievement and behaviour study*

Lanham (1999) then expanded the model further, positing that three additional elements namely administrative decisions, funding priorities and deferred maintenance as the antecedents to school building conditions in his study in Virginia's elementary schools. Brannon (2000) who extended the model further

found that the administrator's (Central Office Administration, School Board, Principals) leadership and financial support are influenced by their perceptions of the school building condition and the action (priorities) that they took as primary factors to their inclination to address school building condition.

Lastly, using the same model in his study of school building condition in a different context of a developing middle-eastern country, Al-Enezi (2002) posited the role of various levels of administration of the Kuwaiti government namely its Ministry of Education and other departments as an important factor within the leadership element as they establish administrative policies regarding school building condition. Similarly, their ethics, accountability, leadership style, authority and knowledge also are important considerations within the leadership domain proposed by Cash (Al-Enezi, 2002). He also added funding as another influential factor to finance ongoing maintenance (Al-Enezi, 2002). Both the financing and administration would influence the available staffing of the maintenance and custodial staff, consequently affecting the school building condition and other outcomes as originally proposed by the model (Al-Enezi, 2002).

In sum, what the models in Figure 2-2 and Figure 2-3 commonly represent are the critical importance of the school building condition and its close relationship with building maintenance as well as its various stakeholders, particularly in relation to students outcomes namely on their achievement and behaviour, within the scope of a school context. Although the focus of these studies are primarily on the effects of the school building condition on the above mentioned outcomes, both the models in Figure 2-2 and Figure 2-3 allude to the importance of school building maintenance, influencing factors in affecting the school building physical condition, subsequent implications to outcomes like attitudes, behaviour and achievement.

In examining all the aforementioned research on school buildings, there are several comments that could be made. Firstly, most of the studies related to school buildings are primarily dominated by research from developed nations in US and UK, mostly in the temperate climate region (Awang *et al.*, 2015). Noticeably, similar studies on school buildings in the context of developing nations and tropical climate like Malaysia are somewhat lacking.

Secondly, while some available literature are unable to demonstrate clear and resounding proof with regards to the effects of school facility conditions on teaching and learning, others present conflicting views regarding the influences of school building condition on teaching and learning (Duyar, 2010). A useful reminder by Stricherz (2000, p. 31) also points to such argument that despite lagging students' achievement in poor school buildings shown by empirical research, it does not demonstrate that their performance improves when school buildings change '*from the equivalent of a Ford to a Ferrari*'.

In addition, it is argued that numerous empirical research lacked research rigour and have methodological shortcomings (Picus *et al.*, 2005). In most cases, the empirical research are primarily quantitative in nature. Hence, the findings are mostly correlational, only demonstrating the associations between the poor school environment and learning, instead of poor school built condition impacting on learning (Woolner, 2010).

In summing up section 2.2.1 and 2.2.2, several conclusions could be made about the research findings with regards to school building. Firstly, there appears to be some consensus that the school environmental elements like temperature, lighting, noise, ventilation as well as the school building condition have some direct or indirect influences on teaching and learning process to a certain degree, in the form of various outcomes. Secondly, another important point which needs to be made at this juncture is that such unfavourable school building condition like peeling paint, damaged toilets, poor lighting, inadequate ventilation and non-functioning heating and cooling system could be attributed to deferred maintenance (Frazier, 1993). In this case, prior studies by Cash (1993a), Hines (1996), Lemasters (1997), Lanham (1999), Al-Enezi (2002) and Earthman and Lemasters (2011) further supported such views. They also give some indication on the key role of school building maintenance in determining the condition of the school building *vis a vis* the physical environment in the school. Thus, their research perhaps fits the purpose as preamble to the next discussion, which focuses on research on school building maintenance proper.

### **2.2.3 School building maintenance as research topic**

Such is the nature of building maintenance, that it is commonly described as a '*Cinderella*', '*not sexy*', '*not attractive*' and '*unproductive*' activity (Seeley, 1987; Jones and Collis, 1996; Wood, 1999; Royal Institution of Chartered Surveyors, 2009b). New building construction typically engenders more interest and excitement than talks about maintaining and repairing old existing buildings (Rubman, 2000). In other words, maintenance has low visibility, low political pay-off and is therefore not newsworthy (Regan, 1989). As a result, maintenance activity has not been recognised in every aspect in an organisation (Lee and Scott, 2008) and it has been given a low priority in the past (Lam, 2000).

In the area of research and study, it has been suggested building maintenance is seriously neglected (Al-Khatam, 2003). It is therefore unsurprising that research on school building maintenance is scarce (Dykiel *et al.*, 2009). In comparison to other aspects of education, the school facilities management has generally received less attention from the educational researcher. Generally there is a deep knowledge gap regarding all aspects of maintenance, in particular within the school context (Theunynck, 2009). This is substantiated by the amount of academic research that has been done with particular topic of school building maintenance. In the domain of professional literature, the management of existing school facilities as a subject has been overlooked even more than school facilities planning (Kowalski, 2002).

However, one might argue the topic is covered by the relevant disciplines of engineering and architecture but nevertheless managing a school building and its maintenance is perhaps different. The difference lies in the uniqueness of the school building. Firstly, it has various stakeholders, with each group having a particular interest on its condition and maintenance. In addition, there are also various rationales of school building maintenance, with each offering different perspectives as later discussed in section 2.4.1. What makes it even more critical is the fact that a school houses educational activities for the young learners at the most important stage of their physiological, physical, social and intellectual development (Strickland and Hadjiyanni, 2013). Besides that, the fact that there is a large number of students who are confined within the

classroom in close proximity to one another for the substantial part of the day represents another unique proposition to other context.

Despite the limited research in the areas of school building maintenance, some have been undertaken. To give an overview of what these research have to offer in terms of better understanding of school building maintenance in the context of education, several are discussed as follows.

To start off, Asiabaka (2008) emphasised on the necessity for effective facility management in schools because the facilities give meaning to the teaching and learning process. Others argued that there is an association between poor school maintenance and poor academic achievement of the students (Berner, 1993). It is therefore vital to student achievement that school buildings are in good condition and adequate funding is allocated to assist ongoing maintenance (Taylor and Enggass, 2009). Thus, financing in school maintenance could reinforce initiatives to radically improve the outcomes of public education system (Filardo *et al.*, 2011). In this case, constant maintenance afforded by adequate budget could help to maintain the school buildings in good condition, which in turn, could then lead to increased test scores (Earthman *et al.*, 1995; Schneider, 2002a).

Further research by Harter (1999) analysed the maintenance expenditure in relation to students' achievement for 1992-1993 academic year and found evidence of the importance of maintaining school buildings. His study results which are statistically significant, indicate that 9.8% of variation in mathematics score and 6.4% of variation on reading score could be attributed to school building maintenance expenditure. He concluded that spending for school building maintenance positively relates to student outcomes (Harter, 1999).

Other school building maintenance research also has enlightened us on another dimension which is perhaps more important than students' academic attainment, namely their health. A review of building reports by Sieber *et al.* (1996) research suggested that regular maintenance of heating, ventilation and air conditioning (HVAC) can have a significant impact on health and performances. The paper, based on a study of building complaints, is one of the



few indicating the importance of HVAC cleanliness and maintenance for human health.

In another study in US, Moulton Jr (1998) examined the perceptions of selected School Board members on the quality and condition, maintenance, improvement and renovation of their existing school buildings using a survey. His sample participants are the School Boards which are responsible for policy and budget allocations decisions that influence the support level for school building maintenance as well as improvement and renovations (Earthman, 1995; Brannon, 2000). The findings suggested that such decisions on school building condition are made in conjunction with other educational demands for limited financial resources which are equally important to address all school issues (Moulton Jr, 1998). With regards to the overall quality and building condition of their school, the majority of the School Boards perceived it was either adequate or better than adequate (Moulton Jr, 1998). The majority also considered themselves to be proactive in tackling issues of school building maintenance (Moulton Jr, 1998). Nearly 70% of the school board members indicated school building maintenance as one of their top priorities (Moulton Jr, 1998).

With regard to the study of building maintenance in Malaysia, there is also a dearth of research on the topic. According to Mohd-Noor *et al.* (2011) the subject of building maintenance is rather new in Malaysia, inferred through the first National Asset and Facilities Management (NAPAM) conference which was only organised in 2007. Facilities management is still a new domain in the Malaysian context, and not until recently an association for them has been established.

With regards to research in the Malaysian setting, only a few research have been carried out focusing on the scope and the element of building maintenance (Mohd-Noor *et al.*, 2011). From the trawl of literature, it appears that such research carried out in Malaysia varies in terms of its focus, types of building studied and approaches used. Dolhan (2006) looked at the IT Web based application in building maintenance system by the Public Works Department (PWD). Hashim (2006) conducted a case study of the maintenance

management services of a government agency. Shah Ali (2009) investigated important factors of cost decision making in building maintenance in Malaysia among building managers. Shah Ali *et al.* (2010) examined factors of housing maintenance cost in Malaysia. Myeda *et al.* (2011) studied the performance of office building maintenance management in Malaysia. (Kayan, 2006) carried out a case study of old building maintenance in Kuala Lumpur. Ibrahim and Yahya (2009) conducted a maintenance management study of private high rise building in the country. Ibrahim *et al.* (2009) investigated technical background of masjid's maintenance staff in Federal Territory Kuala Lumpur. Harun *et al.* (2013) examined maintenance management practices of public sports facilities in Malaysia. Ismail and Kasim (2013) studied maintenance management practices for eight polytechnics in Malaysia.

As far as Malaysian research on school building maintenance is concerned, only a handful of published works are available. For instance Mahli *et al.* (2012) carried out research in school building condition in 134 primary schools in Kuching Sarawak. Among their main findings, it is suggested that building condition is closely related to building age and it supports the theory that older building has more defects than new ones (Mahli *et al.*, 2012). Meanwhile, Ropi and Tabassi (2014) conducted a study on maintenance practice in four primary schools and three national secondary schools. Yacob (2005) investigated the school building of more than 50 schools in Petaling Jaya and concluded that there was a lack of adequate maintenance, although the study unfortunately is not accessible. Mat Nah *et al.* (2012) carried out a quantitative study aimed at identifying implementation problems in school property management in Malaysia. It is found that there are three main factors that are problematic: knowledge and understanding, attitude and manpower (Mahli *et al.*, 2012). Using a mixed-method approach, Yong and Sulieman (2015) examined the assessment of building maintenance management practice and occupant satisfaction of school in state of Perak among the district education officers, principals, teachers and staff. It found that unplanned maintenance to be more dominant and overall satisfaction of occupants were rather mixed.

In general, the small number of published works in the local Malaysian context on the area of school building maintenance alluded to the gap of knowledge which is currently faced in this field. This is presumably because of the

emphasis on the human factor of education, which tends to dominate the education landscape of discussion and interest, which is understandable as aforementioned in section 2.1.3. Some tend to overlook the fact that in order for the learning process to occur, a building is required - a physical structure where students and teachers convene to learn (Earthman and Lemasters, 2013). In the same vein, the problem of school building maintenance and effects of its poor maintenance would only be apparent when something goes noticeably wrong and affects the learning or teaching activities or health.

In summing up section 2.2.3, the above discussion points to the dearth of published works and research in the area of school building maintenance, both internationally and in the local context of Malaysia. What is also lacking is the variance of approach as well as the respondents of these research. Most are primarily quantitative in nature and the sampling of respondents fail to take into consideration the multitude of stakeholders involved within the education system. Thus, the current study intends to address this gap of knowledge and also address this lack of variance of approaches and respondents.

## **2.3 School buildings maintenance**

Building maintenance is perceived as an activity in the bigger context of facilities management (Barrett and Baldry, 2003). It is also considered as part of the construction sector (Ali *et al.*, 2006; Doran *et al.*, 2009). In fact, building maintenance has constantly been labelled as the 'poor relation' of the construction industry, receiving only an implied appreciation or its significance, both within the industry and amongst building owners (Chanter and Swallow, 2008). Perhaps this stems from the view that maintenance is perceived as non-core function that provide supportive services in organisations (Waheed and Fernie, 2009) with its spending typified by renewed budgets (Chartered Institute of Building, 1990).

### **2.3.1 Definition of building maintenance**

The general maintenance literature offers several definitions of maintenance as follows. The definition of maintenance by The British Standard Institute (BSI) appears to be getting more expansive over the years. Maintenance is defined

as *‘work undertaken in order to restore every facility, that is, in every part of site or building to an acceptable standard’* (British Standards Institution, 1964). It was later defined as *‘the combination of all technical and administration actions, including supervision actions, intended to retain an item in, or restore it to a state in which it can perform a required function’* (British Standards Institution, 1991). Maintenance was further developed and defined as *‘the effort in connection with the different technical and administration actions to keep a physical asset in, or restore it to a condition where it can perform a required function’* (British Standards Institution, 1993).

The Chartered Institute of Building (CIOB) defined building maintenance as *‘work undertaken to keep, restore or improve every facility, i.e. every part of a building, its services and surrounds to an agreed standard, determined by the balance between the need and available resources’* (Chartered Institute of Building, 1990, p. 7). It is defined it as *‘work undertaken in order to keep, restore, or improve every facility, its services and surrounds, to currently acceptable standards and to sustain the utility and value of the facility’* (Seeley, 1987, p. 1). A simplified definition is *‘to keep it in as near original condition as possible’* (Stewart, 2007, p. 151). From an educational planners perspective, maintenance is defined as *‘a continuous activity with the purpose of guaranteeing the educational function and environment of school buildings stay efficient’* (Castaldi, 1994, p. 189).

In sum, the essence of the definitions of maintenance imply that the main processes to be considered: retaining and restore. The former means work conducted in anticipation of failure and the latter refers to work carried out after failure. In the context of school buildings maintenance, this includes activities to maintain school buildings with all its aforementioned components so as to keep them in good condition (Mahli *et al.*, 2012), due to the various maintenance causes as the following sections would elaborate.

### **2.3.2 Reasons for school buildings maintenance**

Buildings will not remain static during their lifetime (Douglas, 1996; Wood, 2009; Lateef *et al.*, 2011) as they change, evolve and adapt (Douglas, 1996). They will start to age from their completion (Arditi and Nawakorawit, 1999; Hashim, 2006)

and will continue to decay and deteriorate over time (Brand, 1995; Douglas, 1996; Hawkins and Lilley, 1998; Levitt, 2009; Levitt, 2013) due to various factors as follows: the vagaries of climate (Douglas, 1996; Hawkins and Lilley, 1998; Chan, 2000; Wood, 2009); natural wear and tear (Douglas, 1996; Hawkins and Lilley, 1998; Chan, 2000); use (Douglas, 1996; Levitt, 2013); abuse; and expected service life (Cruzan, 2009; Stanford, 2010). In due course, all these would compromise the capacity of the building to house the activity for which it was established (Levitt, 2013). Such deterioration hopefully could be reduced to a certain degree by effective operational and maintenance procedures (Hawkins and Lilley, 1998; Ashworth, 1999).

The maintenance work is essential for both the old and new buildings (Mahli *et al.*, 2012). In other words, maintenance is required throughout the entire period that the buildings remain in use or in occupation, so that the various facilities are kept to stand consistent with overall policy (Lee and George, 1993), to keep the building as it is or to restore them to its previous condition (Wood, 2009) and to ensure its optimal performance over its life cycle (Olanrewaju *et al.*, 2009). To further illustrate this cycle of a school building life, the valuable work of Handler (1960) on the five life phases of school buildings, though several decades old, is perhaps useful and relevant in terms of understanding this scenario as shown in Figure 2-4.

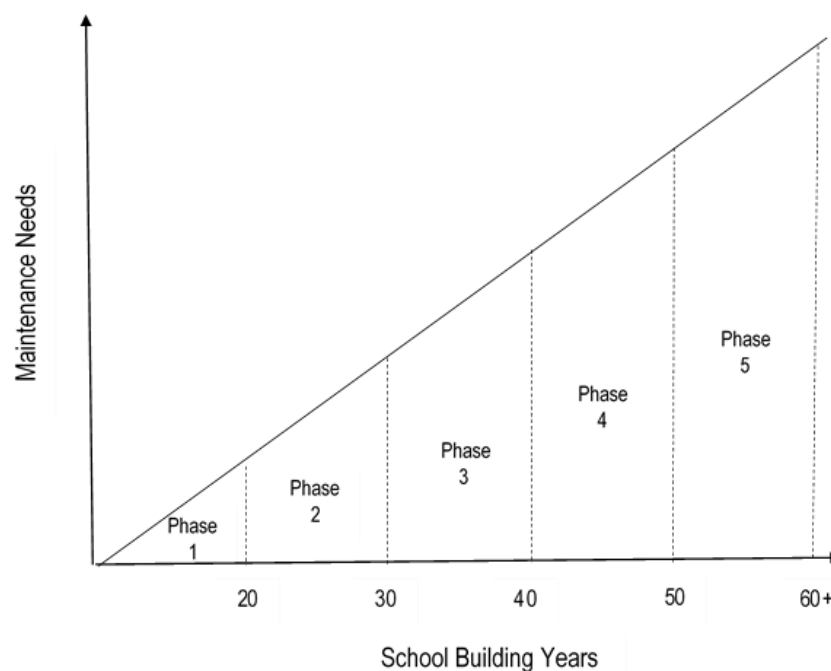


Figure 2-4: Maintenance needs vs school building years (Handler, 1960)

According to Handler (1960), during Phase 1, which is the first 20 years of the school buildings life, maintenance is restricted to minor repairs and small improvements to reflect changes in the instructional program. During the next ten years in Phase 2, the school building would need rising quantity of annual maintenance and extra replacement of worn out equipment. This is followed by the next decade of Phase 3, when general maintenance rapidly escalates as most of the original equipment should have been changed, and main items like electrical and roof fixtures require replacement, due to the natural aging of the building. When the school building is 40 to 50 years old or in Phase 4, it is at an accelerated deterioration stage. In the final stage or Phase 5, the school building will be completely reconstructed or abandoned (Education Writers Association, 1989). Essentially, what it means is that as the age of the school increases, more maintenance is required (Stewart, 2007). This is due to the fact that building materials age, while their structure and building systems decline and deteriorate (Vasfaret, 2002). More importantly, it must be remembered that age is not the factor that undermines the old school building, but it is the lack of care and maintenance (Rubman, 2000). Even new school buildings which are not afforded the regular maintenance it requires, '*will age in a hurry*' (Rubman, 2000, p. 1).

### **2.3.3 Purpose of school buildings maintenance**

As alluded to earlier in section 2.1.1, each school building consisted of many different components (Duffy, 1990; Lstiburek and Carmody, 1994; Brand, 1995) and each component has a fixed expected service life, which to a certain extent dictates the need for building maintenance (Thorne *et al.*, 2013). Hence, as shown in Figure 2-5 below, the main purpose of maintenance is to prevent or minimise the dilapidation or worsening of the service quality afforded by each building component over its design service life (Stanford, 2010). Maintenance, however, does not include the upgrading process that may be required to cater to the added expectations for performance beyond which the component was originally planned to provide (Stanford, 2010).

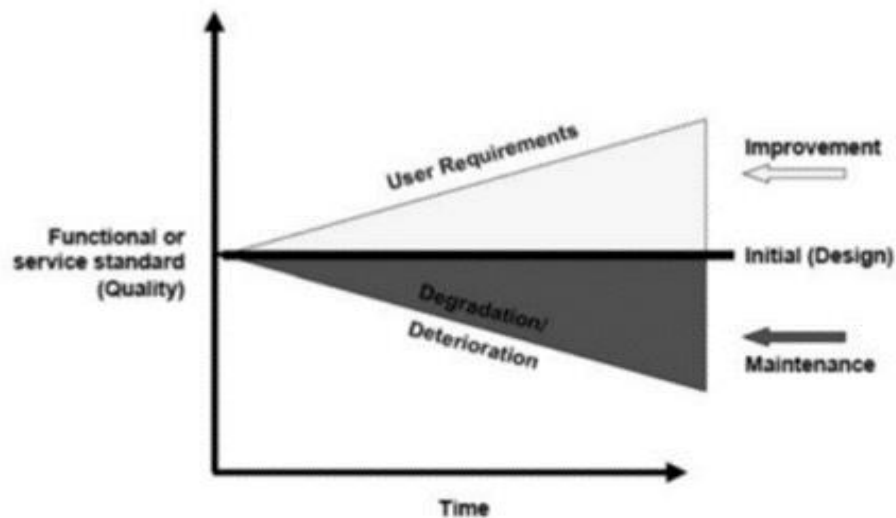


Figure 2-5: Functionality (Quality) vs Time (Stanford, 2010)

In the school building context, the purpose of maintenance is to ensure that the school building as a vital asset, is capable of supporting a school's core operations to function efficiently and effectively, in providing a quality learning environment that is safe, appropriate and adequate for the school users (Aquino, 1985; Szuba and Young, 2003).

#### **2.3.4 Types of school buildings maintenance**

There are several different types of maintenance as follows: preventive, corrective and emergency maintenance. Firstly, preventive maintenance is essentially preserving the physical integrity of the building and reducing corrective maintenance costs (Kyle *et al.*, 2000). Secondly, corrective maintenance is concerned with actual repairs that are undertaken to ensure the continuous function of the building's equipment and facilities (Kyle *et al.*, 2000). Lastly, there is emergency maintenance, which is unplanned type of maintenance which in most cases, could have a detrimental impact to the activities conducted within the building. In reality, however, some research have indicated that there is a common lack of preventive and corrective maintenance in existing schools across different parts of the world, like in US (Council of the Great City Schools, 2014), Australia (Victorian Auditor-General Office, 2008), and El Salvador (Abend *et al.*, 2006).

## **2.4 Maintenance of school buildings**

School facilities have a direct impact on teaching and learning and good school facilities can be provided by efficient maintenance (Schneider, 2002b). Hence, the two main objectives of a maintenance program for the building are to promote a physical environment conducive to enhance the teaching-learning process and to protect the financial investment of the community (Aquino, 1985).

The responsibility of planning and managing school buildings has become an even more significant element of effective practice for both district-level and school-level administrators (Kowalski, 2002). However, this is compounded further as maintenance is regarded as one of the top major school facility issues (Stewart, 2007; Tomal and Schilling, 2013).

As regular maintenance is crucial to keeping schools in good condition, if schools are unable to undertake maintenance when necessary, facilities problems would rise, which could result in health and safety issues as well as increased repair costs (US Department of Education, 2000a). Besides that, maintenance also strongly influences the resilience of the school building (Theunynck, 2009).

Although school building maintenance is vital, it is posited that it yet often overlooked areas of school management (US Department of Education, 2003). Some went so far as to claim that school building maintenance is usually neglected (Yacob, 2005). Some argued that planning and managing school facilities are two of the most neglected areas of school administration, so much so that in many preparatory programs for school administrators, such a course of study is not available (Kowalski, 2002).

### ***2.4.1 Rationales for school buildings maintenance***

There are many arguments which support the need for school building maintenance from different quarters. Such strong advocates for the issue could be drawn from various international bodies as well as governments. The inclusion of the latter is perhaps unsurprising as governments have played a pivotal role in influencing the conditions of the school (Kowalski, 2002).



In its review of the secondary school modernisation programme in Portugal, OECD commended the strategy of placing a long-term maintenance as the central element of the project deemed vital to realise the goals of producing a sustainable education building stock that serve the long-term needs of education (Blyth, 2010). In its report of Education for All (EFA) educational construction projects it funded, the World Bank emphasized maintenance as the second most crucial lesson from the past school building projects (World Bank, 2003).

In addition, many governments of developed nations have stated their stance on the importance of school building in providing a good environment for the process of teaching and learning. The US Department of Education (2000b) claimed that school buildings that can adequately provide a good learning environment are essential for student success. The Scottish government emphasises its commitment to provide well designed, well built and well managed schools, consequently assuring a school estate that is effectively managed and maintained for the long-term by outlining its vision for Scotland school estate (Scottish Executive, 2003). In England, this is afforded by law via the statutory provision of The School Premises (England) Regulations 2012, No. 1943, Regulation 6 and The Education (Independent School Standards) (England) (Amendment) Regulations 2012, No 2962, Regulation 23C, which state that *'school premises and the accommodation and facilities provided must be maintained to a standard such that, so far as is reasonably practicable, the health, safety and welfare of students are ensured'*. Guidance from Department of Education and Training (DET) Victoria, Australia also stressed that *'the condition of the element should be such that the room, building, or site can be reasonably and safely used for its originally intended purposes, without reasonable compromise'* (Department of Education and Training Victoria, 2005, p. 16). Such above mentioned views from different establishments, which support the case for school building maintenance, would presumably be based upon different valid perspectives, some of which are discussed as follows:

#### 2.4.1.1 Education

Firstly, school building maintenance could be rationalised from an educational point of view. Education relies on students being supported by buildings and equipment, not hampered by them (Watson, 2003). Students need as many elements of good educational experience as possible in order to be able to face the challenging future (Duke, 1998). In their learning experience, physical aspect of learning environment does play an integral part. To put this into perspective, the development of ecological psychology which conceptualise the environment as an active part of person-environment system offers a suitable theoretical platform from which the issue of school building and its maintenance could be analysed. Within this theoretical stance, it is argued that physical environments have an important role to play in the behavioural practices that take place in them. Hence, the quality of school as environments specifically produced for learning, or planned learning environments (Duke, 1998), is related to the quality of learning activities that take place in them (Durán-Narucki, 2008). It is further argued that *'the quality of environment, the presence and condition of its features, the decays it suffers, and the level at which it is maintained, are all factors in the quality of the activities that take place in it'* (Durán-Narucki, 2008, p. 278). In similar vein, in the context of school, the environment which it provides in terms of its physical (building) condition and how it is maintained could be seen as having an effect on the quality of the educational activities that occur in the building. Although quality education does not require an extravagant setting, it cannot be achieved in neglected surroundings (The Carnegie Foundation for the Advancement of Teaching, 1988).

The appearance and condition of the school, the comfort and safety it affords, are essential to the student's personal and intellectual development (Rivlin and Weinstein, 1984). In terms of their personal development, the school physical conditions are usually the familiar symbol of respect – feeling that they matter in school, that they belong, that it is their school (Flutter, 2006). The school conditions are essentially physical cues that transmit silent messages to them. Students who are in a dilapidated school will perceive the following messages: they are not special; school is unimportant; and no one really bothers (Branham, 2004). Consequently, these children will potentially avoid going to

school, thus considering education as low priority in life (Branham, 2004). Hence, as discussed in the earlier part of this chapter in section 2.2, there is a need to appreciate that school building does have an impact on the educational process as previous research suggest.

#### *2.4.1.2 Health and Safety*

A school should not compromise on the students' and teachers' health and safety. This brings us to another important rationale on the need for school building maintenance. Such perspective was offered by the World Health Organisation (WHO) and UNICEF, which posited that poorly maintained school building can be one source of disease and ill-health (UNICEF and WHO, 2003). Health problems associated with school buildings can be categorised into five main areas: sick building syndrome (SBS); health threatening building materials; environmental hazards like radon gas and asbestos; lead poisoning; and poor indoor air quality from smoke or chemicals (Grubb, 1996; Grubb and Diamantes, 1998). For instance, the sick building syndrome, described as irritated eyes, nose and throats, upper respiratory infection, nausea, headache and fatigue, sleepiness or dizziness (US Environmental Protection Agency, 2012), is a widely accepted condition that could befall the school building occupants. This threat is something of a concern, considering the fact that in the context of a school building, teachers and young children could be exposed to such illness, with the substantial amount of time they spend in schools (UNICEF and WHO, 2003; US Environmental Protection Agency, 2012). The situation is made even grimmer for the children, as their bodies are still in the critical development stage, hence making them inherently more vulnerable to environmental hazards (US Environmental Protection Agency, 2012). A sick school building would result in three serious problems: health problems, financial problems and public relations problems (Grubb, 1996). In this instance, the financial problems would be the related costs that have to be borne to rectify the health problem, and not to mention the public relation repercussions with the parents and community that follow.

On the basis of the above mentioned arguments, there appears to be a substantial need for school building maintenance. The US Environmental Protection Agency (2010) strongly believes that a structured maintenance program is a foundation of academic performance and indoor air quality (IAQ),

as the adoption of building maintenance could significantly reduce the exposure to indoor air pollutants (US Environmental Protection Agency, 1990; US Environmental Protection Agency, 2012). Recent research also has documented the safety and health hazards associated with poor quality school maintenance. It is also argued that poorly maintained school buildings may have adverse health and safety impacts in causing asthma attacks, lethargy, drowsiness and thus failure to concentrate (Lawrence, 2003). A ventilation system that is poorly or incorrectly maintained usually due to ignorance or cost cutting measures is cited as one of the common causes of sick building syndrome (Reecer, 1988).

#### 2.4.1.3 Economy

To accomplish its purpose, a school requires certain resources (Martin and Loomis, 2012), which refers to *'the means by which the processes of education can be operationalised'* (Foskett and Lumby, 2003, p. 129). Hence, they are essential component of the educational process and must be used with care, programmed into the budget and management plans of the school, and evaluated for their contribution in assisting the organisation achieve its stated aims and objectives (Glover and Levačić, 2012). In the case of a school, there are three critical school-resource management aspects, namely fiscal, facility and human resources that need to be optimised (Everard *et al.*, 2004; Martin and Loomis, 2012; Tomal and Schilling, 2013) in order to accomplish specific objectives of the school, the chief of which being to impart quality education to the students (Dash and Dash, 2008). Apart from its human resource, schools possess financial, material and physical resources too; all of which should be managed properly to accomplish the objectives of the schools (Dash and Dash, 2008).

As educators encounter the growing pressures for more and better educational programs, there is a continuous challenge to satisfy the demands with limited resources (Sybouts, 1992). Public education sustained by tax monies is confronted with the problems of limited resources (Sybouts, 1992) and accountability. Government is faced with increasing demands for education within a context of constraints on public spending (OECD, 1998). In light of this setting, in terms of resource management, apart from optimizing, it is also not simply safe guarding the resources at present but rather of recognising the fact

that some resources continue for a long time and can be made to last longer with proper management (Glover and Levačić, 2012). The school building is a '*capital intensive fixed asset*' (Scottish Executive, 2003) normally constructed with sizeable investment over a long time (Castaldi, 1994; Carlqvist, 1997). It is also essential to ensure that buildings are used effectively and economically as possible (Lee and Wordsworth, 2001). Hence, the school building stocks are valuable assets rather than liabilities (British Standards Institution, 1986; Douglas, 1996; Carlqvist, 1997; Royal Institution of Chartered Surveyors, 2009a). As these buildings are expensive and need to be cared for (Royal Institution of Chartered Surveyors, 2009a), hence, their maintenance should be considered an ongoing investment (Lind and Muyingo, 2009). In turn, such investment would assist in preserving the asset (school) and prolongs its building life, as well as equipment and structure (Levitt, 2013). This is crucial as it is estimated that effectively maintained buildings can be expected to offer half a century or more useful life (Anderson *et al.*, 1992) to continue serving the communities well (Rubman, 2000) instead of premature obsolescence (Hathaway, 1991).

#### 2.4.1.4 Politics

School building maintenance can also be justified from a political perspective to a certain extent. Perhaps this stems from the understanding that school buildings are considered as the most noticeable manifestation of society's investment in public education (Duyar, 2010). As such, their condition means more than a physical state of being. A well-maintained school which presents an attractive appearance is a clear evidence of extending the life of the school buildings (Dykiel *et al.*, 2009). They also represent a prominent public message about the value of education (Cash, 1993a; Scottish Executive, 2003) to students, young people and community and ambition of the future (Scottish Executive, 2003). They convey a strong message to the community that the government places high value on education (Chan and Pool, 1999; Dykiel *et al.*, 2009).

Besides that, a school building that is well-maintained is also a source of pride for the community (Dykiel *et al.*, 2009). It also contributes to the development of good relations with the local community as they would be pleased to know that public monies were spent towards the improvement of their children's school

(Dykiel *et al.*, 2009). In addition, it is also argued that the school building condition also is a public interest due to two other major factors. Firstly, nearly 20% of the public are parents who have school age children and naturally are anxious on how the school building issues affect their own children (Stewart, 2007). People in most localities have shared value that places importance on giving due care to material things particularly school building that houses not only their children, but grandchildren, nieces and nephews (Stewart, 2007). This is because they want school buildings which are safe, accessible, well-maintained and ready for use (Stewart, 2007). Secondly, virtually all members of the public contribute to the national tax purse (Stewart, 2007).

The condition of a school building ultimately reflects the state of commitment of one generation to the advancement of the next (Kennedy, 2004), the building assets are critical in terms of delivering important community services for the government (Kumar, 2013). One needs to understand what buildings are for – a resource that can be used by organisations and individuals to achieve their goals (Duffy, 1990) or an enabler for the organisation (Douglas, 1996). The building is not the end product, but rather the means to an end (Levitt, 2013). In this view, the school building is a resource for the government to achieve the goal of providing a quality education for the children. The school building is an enabler for the government to provide a public service – education to its people. As this is a long-term mission, the deterioration of the school building is unacceptable (Levitt, 2013). Therefore, the effective and efficient management of these assets is crucial in order to maintain sustainable delivery of those services to cater both present and future needs and aspirations of the community (Kumar, 2013). It is the belief of the Malaysian government that national assets and facilities like school buildings that are functioning well will contribute to a more efficient and effective public service (Alexander, 2011). Besides that, quality facilities like schools that are effectively maintained will also have an impact on image and reputation on public service delivery and productivity (Alexander, 2011).

#### 2.4.1.5 Society

While well-maintained school buildings are deemed essential for those users like teachers and student, there is also the societal perspective to be taken into consideration.

Firstly, the school has a special place in the context of most society. It is argued that a school is a significant component in the landscape, civic life and also history of most communities (Filardo, 2002). It epitomizes the heart of the society (US Department of Education, 2000a). Such is the importance of school building that it has been acknowledged as one of the central component of society since the beginnings of America (Baker and Bernstein, 2012). Similar sentiment is acknowledged by the Scottish government which views school as an integral part of the community (Scottish Executive, 2003). Considered as one of the most common public buildings, school buildings regularly cater to wider users, like parents, neighbours and other community members (Rubman, 2000), defining and anchoring neighbourhoods and communities (Filardo, 2008). In such case, the school buildings function as important venues of public meetings like PTA meetings, voting centres as well as emergency shelters (Filardo, 2008). The school building represents a critical value to the social mobility of the children, but also to the communities in particular as well as the overall neighbourhood regeneration in general (Chiles *et al.*, 2015). Properly maintained and looked after, the school buildings can be a source of community pride (Young *et al.*, 2003; Uline and Tschannen-Moran, 2008) that are admired and loved (Harwood, 2010).

Another argument which supports such expectation is further enhanced with the advancement of a civil and modern society, where schooling is seen as one of its entitlement provided by the government. As such, it is argued that all children are entitled to attend school which provides safe, clean and appropriate educational environments (Picus *et al.*, 2005). The government has a moral obligation to provide young people with safe and well-designed schools (Duke, 1998). It also has a duty of care to provide a decent school environment, which is an entitlement for all students (Royal Institute of British Architects, 2010). Its appearance therefore should reinforce the function of the school as a safe haven for young students, personifying the heritage and future aspirations of the local community (Meek, 1995).

In addition, the condition of the school speaks volume about the quality and value of education to its user and wider community. This is understandable as '*school buildings are a signature part of public education*' (Filardo, 2002, p. 16) and their physical existence have always been considered as the success

symbol of grassroot delivery of national education policy worldwide (Uduku, 2015). This is further amplified by the argument that quality education is significant as it benefits more than the person being educated, but also his or her family, and the society in which the person resides (Public Education and Business Coalition, 2004). Hence, it is argued that school buildings communicate implicit messages to not only those who use them but those that gaze at them from the outside (Annesley *et al.*, 2002). This refers to the '*curbside image*' of the school, which is essentially the impression given when parents or members of the community pass by or come to the school (Strickland and Chan, 2002). Previous research has shown that the quality of school buildings influences the public's perception of the school (Young *et al.*, 2003). In addition, the impact of the first outside impression of such a venue of learning would also have influence future assumptions about the quality of education being served (Weiss, 2004; Cash and Twiford, 2009) as well as perception of the people and program within it (Filardo, 2002). Furthermore, the school is not merely brick and mortar but it is a symbol of commitment to education (Lackney, 1999b; Jarman *et al.*, 2004) and the purposes of schooling (Uline, 1997) as well as due care of public property and the children in the school (Strickland and Chan, 2002).

In contrast, the failure to spend on school buildings transmits a hidden negative signal to the students that their education does not matter. In its study of the quality of learning environments in urban schools, The Carnegie Foundation for the Advancement of Teaching (1988) voiced deep concern regarding the quality of learning environments and the implicit negative message of the physical indignities that was being relayed to urban students. The message signals neglect and the students' negative behaviour like graffiti drawing appears to be an extension of the school buildings that they learn (The Carnegie Foundation for the Advancement of Teaching, 1988). In a separate study by DC Committee on Public Education (1989), the state of disrepair of the school building transmits a powerful hidden message that what is occurring within the school is insignificant and the school system is unconcerned, and neglect is acceptable. The report cited the poor condition of the school building as contributory factor to the attitude and discipline issues, which consequently influences the school's poor performance (DC Committee on Public Education, 1989). In addition,



Poplin and Weeres (1992) who conducted an intensive study of teachers, administrators and students in four schools reported that the miserable physical condition of many schools appeared to reflect the society's lack of priority for the students and their education. Blishen (1969) related his experience on the matter in his argument below:

*Yet it is clear to me, especially since I have always taught in buildings of a fairly monstrous character, that buildings do matter; that the fabric of a school does speak to the children, and that it says, 'I express the community's notion of what you are worth, of the environment you deserve.' An ugly, inconvenient, wholly unpleasing school building makes a daily statement to the children; and children do notice.*

(Blishen, 1969, p. 44).

To make matters worse, it is also argued that when the school buildings are in a poor state, the community is less likely to participate in activities that are supportive of the school's mission (Uline and Tschannen-Moran, 2008). Hence, it is an obligation of the community to afford at minimum, a decent and safe school facilities to the teachers and students (DC Committee on Public Education, 1989).

#### *2.4.1.6 Regulations*

Another rationale for school building maintenance is to comply with the statutory rules and regulations. For instance, in USA, school buildings are subjected to the respective local and state building and safety codes. In addition, at the federal level, they are subjected to EPA regulations for hazards like asbestos, radon; standards of Occupational Safety and Health Administration (OSHA) and accessibility requirements under Individuals with Disabilities Education Act. (Thompson *et al.*, 2013). In the case of England, as mentioned in section 2.4.1, it is a statutory obligation stated in The School Premises (England) Regulations 2012, No. 1943, Regulation 6 and The Education (Independent School Standards) (England) (Amendment) Regulations 2012, No 2962, Regulation 23C.

## **2.4.2 Maintenance practices**

In the following sections, several maintenance practices are examined. These are maintenance policy, maintenance planning, maintenance organisation and maintenance implementation.

### **2.4.2.1 Maintenance policy**

One aspect which is very important in school building maintenance is the policy of maintenance. It is argued that one of the pillars of any building maintenance management is the maintenance policy (Allen, 1993), which serves as a management framework for those involved in maintenance by outlining the overall policy of maintenance (corrective and preventative) and the standard of maintenance (Lee and Scott, 2009). Some also suggested that the maintenance policy should contain the following five central elements (Royal Institution of Chartered Surveyors, 1990; Lee and Wordsworth, 2001; Chanter and Swallow, 2008): a) the duration for maintaining the building current use; b) the buildings with their components life requirements; c) the expected standard of building maintenance; d) the response time needed to solve the issue; and e) the legal and statutory obligations. The main purpose of the maintenance policy is essentially *'to ensure that value of money expended is obtained, in addition to protecting both the asset and the resources value of the building concerned and the owner against breaches of statutory and legal obligations'* (British Standards Institution, 2012, p. 2). Without a policy in place as guidance, there is a potential risk that the building maintenance process could be managed in a disorganised fashion (Lee and Scott, 2009).

In the US, the maintenance policy of school building is difficult to determine, as research similar to the current study is scarce. Available literature referred to the state school facility policies instead, which emphasised new school building construction over maintenance projects in most states (Rubman, 2000; Beaumont and Pianca, 2002). The driving factor was that states will usually offer at minimum partial support for new constructions, but virtually none for maintenance (Beaumont and Pianca, 2002). This was acknowledged by the New York State Comptroller, who stated that there is an inherent fiscal incentive that exist within the present state policy for local school district to avoid maintenance, but instead letting the physical school building to deteriorate to the extent that new construction is the only viable option (Rubman, 2000).

However, several states school facility policies affirmatively address the significance of maintenance in their schools in places like Massachusetts, Vermont, Washington State and Maine (Beaumont, 2003, p. 21). The school districts in Massachusetts are under strict instruction to spend a minimum of 50% of their maintenance budget each financial year, with failure to meet this requirement resulting in the school districts not getting state funding for future capital projects. In addition, maintenance rating are implemented, with poor rated districts receive no incentive percentage points (Beaumont, 2003). While in Vermont, the rules assert that any future school projects which has stemmed from significant deferred maintenance would receive no state construction funding (Beaumont, 2003). In Washington, schools built after January 1993 are required to use a minimum of 2% of their operational account on school building maintenance. The same prerequisite applies to all schools in Maine, which also have to have school building maintenance plans and submit its report to the state education department (Beaumont, 2003).

Meanwhile, in the UK, the EFA have recently introduced an advice note entitled 'The essential school: a guide for schools', which focuses on '*effective planning and responsibilities for maintenance*' (Education Funding Agency, 2016, p. 3). It emphasises the need for all schools to have an effective arrangement to manage their school buildings. Furthermore, it advised those parties who are responsible for school building maintenance that they should: '*a) maintain school buildings so that they are safe, warm and weather tight, and provide a suitable learning environment; b) deal with emergencies promptly and efficiently; c) plan how they manage their premises and other assets; and d) manage and procure maintenance works efficiently*' (Education Funding Agency, 2016, p. 3).

#### 2.4.2.2 Maintenance planning

Another vital aspect of maintenance practice is maintenance planning (Allen, 1993). Proper maintenance of school facilities demands a focused program of identification of need and accomplishment of task with appropriate financial support, which paves the way for the school buildings to be preserved in a good condition (Earthman, 2003).

Nevertheless, in reality, maintenance planning is still lacking in many countries across the world. In the US, it is argued that there is the lack of planned maintenance in schools, which resulted in further deterioration and increased total cost of maintaining the buildings at an acceptable standard that enable them to operate effectively and fulfil their life expectancy (Council of the Great City Schools, 2014). It is argued that the reduction of planned maintenance works are mostly financially driven to save money by school districts over the years, which in the long run resulted a more frequent and expensive breakdown repair and replacement (Council of the Great City Schools, 2014).

Similarly in Australia, it was found that short-term approach to school building maintenance planning is prevalent in all 20 schools visited by the Auditor General of the State of Victoria, with 50% of the schools carrying out maintenance works as they occur (Victorian Auditor-General Office, 2008). Not a single school has any long-term maintenance planning as the insufficient financial resources limit the school's ability to develop such plan for their respective buildings (Victorian Auditor-General Office, 2008).

Findings from the local education authorities' inspection report in England reported that most expenditure on school building maintenance was paid for urgent, reactive works, rather than planned maintenance (UK Audit Commission, 2003). Such reports perhaps alluded to the fact that maintenance planning is still lacking.

#### *2.4.2.3 Maintenance organisation*

The next practice is maintenance organisation. In the US, a dedicated facilities department is available at the school district level. This provides the primary maintenance personnel support at the school district level which includes school building engineer, general maintenance mechanics, electricians, HVAC specialist, locksmith and carpenters (Office of Superintendent of Public Instruction, 2010; USREAP, 2016). Their duties are to support the maintenance of the public schools within the whole district.

#### *2.4.2.4 Maintenance personnel*

While school building construction are mostly labour-intensive, the same could be said with building maintenance (Olanrewaju and Abdul-Aziz, 2015), with statistics showing that about 40% of the construction industry workforce is

employed for maintenance (Chanter and Swallow, 2007). In schools in some parts of the world, there are dedicated school-based maintenance personnel, called 'custodian' in the US (Kowalski, 2002; Office of Superintendent of Public Instruction, 2010) and Canada (Hammer and Thompson, 2013), or 'assistant caretakers, caretaker and site/premises manager' in UK (Blatchford *et al.*, 2006; Whitehorn, 2010; UNISON, 2016). To a certain extent, the US public schools appears to be relieved from many more routine functions and activities including school building maintenance due to the fact that these are being administered by the aforementioned facilities department at the school district level (Tyler, 1985; Earthman and Lemasters, 2013).

#### *2.4.2.5 Maintenance implementation*

Another maintenance practice which needs consideration is the way in which it is undertaken. In meeting the maintenance demands of the school building, there are three possible choices namely in-house personnel, outside contractors or a combination of both (Levitt, 2013; Olanrewaju and Abdul-Aziz, 2015).

In the case of US, it appears that the minor routine maintenance would be handled by the in-house custodian while the major maintenance works are primarily undertaken by the school district school facilities department (Castaldi, 1994; Chan and Richardson, 2005) as mentioned in section 2.4.2.4.

Nevertheless, it is also argued that the size and complexity of the maintenance jobs in relation to the available skills and personnel of the school district also is a determinant factor (Stewart, 2007).

Meanwhile, in England, many schools would have a contractual arrangement in the form of Service Level Agreement in place with their respective local authorities or other providers to undertake the maintenance works (Education Funding Agency, 2016). In the case of schools built under the Private Finance Initiative, these works would be the contractual responsibilities of the PFI provider (Education Funding Agency, 2016).

### **2.4.3 Challenges of school building maintenance**

As most people as well as pupils continue to believe that education is delivered in a social setting where young people learn with others, the school will remain

as a centre of learning for most children and young people (Scottish Executive, 2003). Hence, school buildings would remain as significant assets which typically are constructed with substantial amount of investment that is going to be used for the long run (Carlqvist, 1997). As such, they need looking after, which inescapably involves a huge financial cost (Royal Institution of Chartered Surveyors, 2009a; Ministry of Education Ontario, 2010), as the price of a building comprises of the initial construction cost as well as the added maintenance cost for the duration of the building life (Hawkins and Lilley, 1998).

Without sustained investment in the form of maintenance, the school buildings would gradually deteriorate over the course of time (Levitt, 2013). The following paragraphs seek to discuss the main related issues and challenges, with specific relation to the issue of maintenance.

#### *2.4.3.1 School portfolio*

One major challenge concerns the school portfolio itself faced by many countries, namely their quantity and age. Firstly, it concerns the quantities of the school buildings. It is argued that the existing portfolio of schools in itself is a substantial resource (Chanter and Swallow, 2008), which would be utilised in the long- term (Carlqvist, 1997). For instance, in the US, there are currently 13,500 public school districts with around 98,300 public schools (National Center for Education Statistics, 2015). One also needs to consider the growing number of school buildings being added from time to time to keep up with increasing capacity demands (McColl and Malhoit, 2004). Secondly, it concerns the age of the existing school portfolio. For instance, the age of the public school buildings in the US is over 42 years old on average (Council of the Great City Schools, 2014) and around 28% are more than 50 years old (Rubman, 2000). Both these factors represents a challenge for the education authorities to undertake school building maintenance in terms of primarily the finance side of the equation as the following section will elaborate.

#### *2.4.3.2 Maintenance finance*

Another important challenge in school building maintenance is related to its financial allocation. In order to ensure that adequate maintenance could be performed to the building, proper financial support is essential (Earthman, 2003; Taylor and Enggass, 2009) so that the buildings can be preserved in a good

condition (Earthman, 2003). In contrast, plans to maintain school buildings cannot be realised if they are deprived of adequate funding (New Jersey Institute of Technology, 1990). Although it is argued that size, usage and conditions are among the main factors which would influence the maintenance investment (Levitt, 2013), as a general rule of thumb, expenditure of maintenance over a 20-year period should be equal to the original construction cost (World Health Organisation, 1997).

Although the need for school buildings maintenance and budgets is recognised by global organisations like The World Bank (2003) and (World Health Organisation, 1997), such acknowledgement is not always supported in practice by allocating the resources needed for such inescapable reinvestment (Then, 1996). Generally speaking, insufficient consideration has been given to establishing an adequate funds for maintenance (Baker and Peters, 1963). Despite experts suggesting that annual budget allocations of 5% for maintenance, recent findings revealed that schools only allocate 3% (Lunenborg, 2010). In the US for instance, records showed that capital outlay expenditure which includes the expenditures for school property and buildings and alterations per person has been in decline significantly for the past decades (Agron, 2003; US Department of Education, 2016).

Furthermore, literature seems to point out that the maintenance budget not commensurate with the actual need (Lam, 2000; Lo *et al.*, 2000; Tse, 2002; Lee and Scott, 2009). It is even argued that the existence of such gap is an international issue (Shen *et al.*, 1998). This is substantiated in practice by cases involving several developed countries including US (Filardo, 2016), Canada (Hansen, 1993), UK (UK Audit Commission, 2003), Australia (Victorian Auditor-General Office, 2008), and even Central American like El-Salvador (Abend *et al.*, 2006) who all faced insufficient budgets for their school buildings maintenance, caused by deferred maintenance and the increased number of new school buildings to cater to the growing demands for school places (McColl and Malhoit, 2004). As such, some argued that it is inconceivable that financial allocations would match rising maintenance needs of public buildings (Shen *et al.*, 1998), especially considering that they have to compete against other resources (Chanter and Swallow, 2008).

It is posited that allocation of funds for school maintenance is often the last in and during tight budgets will be the first out (Chick, 1987; New Jersey Institute of Technology, 1990; Agron, 2003). With tight financial constraints, it is commonly easy to consider maintenance budget as soft money – an expense that can be reduced without affecting core academic programs (US Environmental Protection Agency, 2010). Hence, routine school building maintenance gets short changed as money is diverted to items that directly impact education (Ennis and Khawaja, 2001; Lawrence, 2003). Similar fate also befalls Portugal, as school building maintenance allocations from state budget are commonly among the first cut during tight financial periods (Chick, 1987; Vieira and Cardoso, 2006). This is unsurprising as one early school building scholar has reminded us that there would be times when a maintenance cost would be so significant that *'sound principles are in danger of being sacrificed, and school hygiene forgotten, in a mistaken zeal for defending the purse string'* (Robson, 1874, p. 271). What these policy-makers fail to realise is the fact that such budget reduction would not only affect the future budgets but most significantly, the students and teachers currently on the ground (Berner, 1993).

Nevertheless, the challenge of school building maintenance financing in the US is rather different and much more complex, due to its existing K-12 school facilities funding structure which are deemed *'inherently and persistently inequitable'* (Filardo, 2016, p. 3). Although, the school facilities maintenance enjoys federal and state assistance to some degree, most school districts throughout the country are faced with continuous pressure to make up for the balance of around 45% shortfall of maintenance expenditure through the local taxes, despite the disparate and varying differences of wealth level that exists between districts (Filardo, 2016). This is because traditionally associated costs of school building have been the local school districts duty (Coffey, 1992; Brannon, 2000; McColl and Malhoit, 2004), raised based on the financial ability and willingness of its local community via property and local taxes (McColl and Malhoit, 2004). The issue is exacerbated further in rural areas where incomes, values of property and local tax have been in decline (McColl and Malhoit, 2004). In some cases, the school systems do not possess any leeway to issue debt or levy taxes to finance cost necessary to keep their building in good condition (Earthman and Lemasters, 2013). Hence, with the absence of



redesign of such current school funding formulas, it is argued that it further perpetuates the inequalities of school facilities in US education (Kozol, 1991). This brings to the fore another key challenges of school building maintenance, namely deferred maintenance.

#### *2.4.3.3 Deferred maintenance*

Perhaps one of the biggest challenge of school building maintenance, which is inextricably linked to the issue of funding resources, is deferred maintenance. This is a term which refers to the accumulation of physical building component that is in need of repair as a result of age, use and damage, and for which remedial work has been postponed that surpassed the useful life of the system (Hutson and Biedenweg, 1982). It is argued that deferred maintenance can have some repercussions as follows: a) increased total costs of managing and operating facilities; b) rise of frequency of unexpected and costly critical and emergency repairs; c) increased occurrence of interruptions to delivering instructional programs; d) augmented risk of defaults on warranties of equipment and building components; and e) premature failure of buildings and equipment, necessitating substantial and often unexpected capital expenses (Council of the Great City Schools, 2014).

Such deferred maintenance in reality, primarily driven by the limited funding availability due to other pressing needs like books and supplies, computers, teacher's salaries, new programmes mandated by federal and state legislation (Rubman, 2000), has snowballed into a monumental task for many developed nations like US, Canada, UK and Australia.

In the US, it is reported that despite the anticipated increase of students' enrolment, state and local school construction funding continue to decrease to around USD 10 billion in 2012, while the condition of the US school building continue to be a public concern (American Society of Civil Engineers, 2013). Such was the appalling state of the nation's school buildings that one Senator Harkin from the state of Iowa expressed his dismay in the US Congress at one point:

*It is national disgrace that the nicest places our children see are shopping malls, sports arenas, and movie theatres, and some of the run-down places they see are their public schools. How*

*can we prepare our kids for the 21st century in schools that did not even make the grade in the 20th century?*

(Congressional Record, 2000, p. 4854).

A recent report card by American Society of Civil Engineers rated D+ (poor) in their evaluation of US schools, and estimated a minimum of USD 270 billion worth of investment is necessary in order to maintain the school buildings and bring them into a satisfactory condition (American Society of Civil Engineers, 2013). This is a considerable increase in comparison to the earlier estimates from the past: USD 25 billion in 1983 (American Association of School Administrators *et al.*, 1983); USD 41 billion in 1989 (Education Writers Association, 1989); USD 100 billion in 1991 (Fenster, 1991); and USD 127 billion in 1999 (US Department of Education, 2000a).

The situation is similar in US nearest neighbour, Canada. It was earlier estimated that its maintenance backlog cost to be around CAD 992 million (Hansen, 1993). Recently, the Ministry of Education Ontario reports around CAD 3 billion worth in high and urgent repairs were needed, with 85% of the Ontario student population reportedly taught in school buildings that need at least one major school repair (Ministry of Education Ontario, 2010; Hammer and Thompson, 2013). Latest reports indicate that CAD 15.4 billion 1,666 school buildings out of 4,658 school buildings are in poor condition while 278 are in critical condition (Ministry of Education Ontario, 2016). In order to support the initial major repairs, the aforementioned ministry has agreed to provide an estimated CAD 75 million every year, focusing on a list of preliminary schools that met the eligibility criteria for being worse for wear, which primarily emphasise on basic repairs such as lighting and structural stability (Ministry of Education Ontario, 2010).

Likewise in UK, the backlog of maintenance was estimated at around GBP 7 billion to address condition priorities in local education authority schools in England (UK Audit Commission, 2003) which has exponentially risen from GBP 860 million in 1985 (UK Department of Education and Science, 1985). This reflects the insufficient investment in school building maintenance by most local education authorities in England in the past, particularly during the 1980s and 1990s (UK Audit Commission, 2003; Chiles *et al.*, 2015, p. 15). In fact, Local

Education Authorities inspection report indicated that some allocation for school building maintenance was diverted to other priorities in some schools (UK Audit Commission, 2003). However, this has fortunately been partially addressed through the UK's Building Schools for the Future initiative by the government from 2004 to 2012 (Chiles *et al.*, 2015) and subsequently the current Priority School Building Programme (PSBP) (Education Funding Agency, 2013).

In Australia, the deferred cost of maintenance of the Victorian schools is estimated to be around AUD \$230 in 2005, due to its failure to keep up with actual maintenance needs attributed to insufficient levels of maintenance expenditure (Victorian Auditor-General Office, 2008). Hence, the adequate maintenance of current school buildings stock represents a major challenge for both the government and schools (Victorian Auditor-General Office, 2008).

#### *2.4.3.4 Knowledge and skills*

Another challenge is with regards to the knowledge and skills of managing school facilities. There is a prevailing belief that school principals have the required knowledge and skill of school building management and would learn them through on-the-job experience (Kowalski, 2002). Such a notion is perhaps unjustifiable, considering the huge initial capital investment on the school building as well as unnecessary risks to the safety and well-being of its occupants. In addition, foundational knowledge and skill are perhaps essential for the school principal in order for them to benefit from their experience (Kowalski, 2002).

## **2.5 Summary**

As mentioned in section 2.1.3, there appears to be a virtual disregard of school building by some quarters due to various reasons. Nevertheless, growing empirical research has extended our knowledge and understanding on the importance and impact of the school building and its condition. This chapter has demonstrated that school facilities do matter to a multitude of stakeholders: to students who enter a school building every day; to teachers and staff who educate the students and whose workplace is a school; and to communities where the school performs as a vital space for neighbourhood activity (Moore, 2012). In essence, school buildings should not be viewed as simply a collection

of bricks and mortars, or a mere container for teaching and learning as the physical setting (Lackney, 1999a) in which learning takes place independent from the school building condition (Lackney, 1999b). As the empirical research has shown, the school building has impacts on three levels: how one teaches; how one learns; and how one feels about oneself and also others (Lackney, 1999b). As previous studies on working conditions have demonstrated, an employee can be affected by the working condition. It is perhaps not too far fetched to suggest that the same applies to teachers. Their working condition in school could affect their ability to provide a quality education as aspects like infrastructure condition all influence their experience as educators. (UNICEF, 2000). To a certain extent, this could have an effect on their behaviour and attitudes towards continuity to teach (Johnson, 1990). As effective teachers are found to be caring and highly dedicated (Craig *et al.*, 1998), they need a supportive working environment to continue these positive attitudes (UNICEF, 2000). If they are one of the key factors in delivering quality school process (UNICEF, 2000) and expected to perform their best in dispensing their duties in school, it is perhaps only right that their working condition is in a good condition too.

The following quote by McColl and Malhoit (2004) perhaps best demonstrates the need for school building condition and consequently its maintenance in the context of a high quality education:

*A rigorous and enriched curriculum. High quality teachers. Strong leadership. These are essential components of a high quality education. Yet, even where these conditions exist, student learning is difficult if the school building is substandard or suffers from old age and neglect.*

(McColl and Malhoit, 2004, p. 4)

In addition, a school with inadequate school facilities would deny the students of a vital prerequisite for effective schooling, which is a safe and healthy building that encourages learning (McColl and Malhoit, 2004). Besides that, as empirical research has demonstrated, the most vital impact of the school building on the critical learning factor is on time on task (UNICEF, 2000). After all, to enable the delivery of a good education to students, the schools need to be conducive to

learning, due to the fact that *'a high quality education might not be as accessible in an unfavourable environment such as a poorly maintained building'* (Al-Enezi, 2002, p. 1). Essentially, what better school buildings brings into the learning equation is that it can provide better environments for successful education Walden (2015). At the very least, it is perhaps sensible to argue that the future of our children is well worth the investment (McColl and Malhoit, 2004). To borrow the words of Boyer (1989), *'as we continue to invest in education, building our cathedrals of learning, consequently we are reaffirming the notion that university, is a venue where civilisation will be preserved, learning will be valued, and potentialities of each student will be served'*. In a similar vein, this quote could also be applicable in the school context.

When one fully understands the impact of school building in its various forms, only then perhaps one can truly appreciate the necessity to maintain school buildings (Stewart, 2007). This is because although the school building's age is a vital factor in building deterioration, the condition of the buildings depends to a large extent on the adequacy of maintenance (Lackney, 1999a). Despite this understanding on the vital importance and impact of the school building and its condition to the process of teaching and learning, research in the area of school building maintenance is still lacking. Perhaps this lack of interest in empirical research in this areas does contribute to a certain extent to the challenges currently faced by the some nations with regards to their school building maintenance. Hence, this study aims to contribute to filling this gap of knowledge, merging together the existing knowledge on previous studies on school buildings and maintenance dominated mostly by the US, and expanding further the understanding of the topic, albeit in a different context. This hopefully will contribute to the betterment of school building maintenance in terms of placing it more prominently in educational research, policy and practice.

## **Chapter 3. Research methodology**

The current study intends to explore the issue of school building maintenance key practices, challenges and its implications in the secondary schools in Malaysia by drawing from the multiple perspectives of key stakeholders' experiences in school building maintenance on the ground. To this end, the research methodology adopted for this study represents a vital element of this research. This particular chapter describes the application of the methodology and procedures that were applied in the current research to serve its objectives. Besides that, it also addresses the choice of research design as well as data collection methods and procedures which were undertaken for the study. This includes the justifications for the population and sampling strategy. In addition, the data analysis and data integration carried out in the research is also explained. Last but not least, main ethical and validity and reliability considerations in relation to the study are discussed.

### **3.1 Research design**

This research is essentially a cross-sectional study, which is aimed at finding out the state of school building maintenance issues at a single point of time (Creswell, 2003; Bryman, 2012). In the context of the current research, the mixed methods approach is chosen by the researcher to conduct the research of the topic. Before venturing any further, several definitions of mixed method are presented below.

#### ***3.1.1 Mixed methods: rationales for use and theoretical underpinnings***

As pointed out by Creswell *et al.* (2003, p. 212), the term used to indicate a mixed methods research differs significantly in the procedural discussion of such a design. Nonetheless, fundamental to these themes is the notion of combining or integrating different methods (Creswell *et al.*, 2003). However, the term 'mixed methods' is perhaps most appropriate (Creswell *et al.*, 2003, p. 212) as recent writings seem to suggest (Bryman, 2006; Tashakkori and Teddlie, 2010). As described by Tashakkori and Teddlie (1998), mixed methods denote the use of both quantitative and qualitative viewpoints at specific points

in a research. In its simplest term, a mixed methods research design comprises incorporation of both qualitative and quantitative methods of data collection and analysis in a single research (Creswell, 1999). A more comprehensive definition of mixed methods study suggests that it consists of '*the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given priority, and involve the integration of the data at one or more stages in the process of research*' (Creswell et al., 2003, p. 212).

The justifications of use of the mixed methods in this study are founded on the following arguments. Firstly, in the context of the current study, school building maintenance is a complex subject as it involves various stakeholders from all levels of the educational structure, from educational officers at the federal ministry and state level, principals, to its end users in the form of teachers and students. Hence, due to the social phenomena of school building maintenance which is so intricate, a mixed methods study is chosen to best comprehend these complexities in the subject matter (Greene and Caracelli, 1997).

Secondly, the mixed methods is also deemed most suitable for this research as it combines the strength of both quantitative and qualitative aspect of research and because of the increasing appreciation of the limitations of single methods (Gillham, 2005). In addition, there is a general agreement that combining different types of methods can reinforce the research (Greene and Caracelli, 1997) as the specifics of qualitative data like interviews can afford insights which are unobtainable through common quantitative surveys (Jick, 1979). Essentially, the survey identifies the extent of the problem, while the interviews can be used to convey the detail and '*the unobservable*' (Wellington, 2000) or '*the story*' (Bricki and Green, 2007). In the context of the current study, the quantitative aspect of the research via the questionnaire would enable the researcher to capture general information as well as unearthing the potential salient points on the issue of school building maintenance in the respective schools. Meanwhile, the qualitative methods would be most suited to the task of obtaining a better understanding of the issues of school building maintenance in a more detailed and in-depth manner. This is because it offers the researcher the opportunity to pursue the finer details of the accumulated quantitative data,

focusing on its salient issues which are significant to the research that was not captured or not fully captured by the initial questionnaire.

Thirdly, the application of mixed methods for the current research permits the researcher to understand the world from the respondents' viewpoints, *'to gather descriptions of the life-world of the interviewee with respect to interpretation of the meaning of the described phenomena'* (Kvale, 1983, p. 174), consequently giving voice to the participants, which is important in qualitative research (Denzin and Lincoln, 2000). This bodes well with the aim of the study, which is to explore the school building maintenance issue from different perspectives of the various stakeholders be it administrators or end users alike. As a result, it is hoped that a more comprehensive view on the issue of school building maintenance with regards to its current practice and implications to its end users would be gained with the use of mixed methods approach.

In addition, mixed method is chosen as previous academic research on school buildings (Cash, 1993a; Hines, 1996; Lemasters, 1997; Lanham, 1999; Al-Enezi, 2002) as alluded to earlier in previous Chapter 2 seems to be dominated by a single method approach. However, some post occupancy evaluation (POE) research associated with school building performance by others (Watson, 2003; Watson and Thomson, 2004; Abend *et al.*, 2006) argued for a mixed methods approach. This perhaps stems from the argument that mixed methods enabled the documentation of data of not only the explicit physical state of the building (photo) but the accounts of its relationship and impact especially on the building occupants (interview).

The mixed models application in the current study is not simply a combination of quantitative and qualitative methods, but it represents the third paradigm, namely pragmatism (Tashakkori and Creswell, 2007). The appeal of pragmatism in this study is based fundamentally on its practicality more than philosophical basis as pragmatism focuses on considering research as a human experience which is based on the actual beliefs and actions (Morgan, 2014). The pragmatic approach is also grounded on the belief that the practicalities of research are such that it cannot be determined by purely theory or data alone. It is the significance of this merger between beliefs and actions in the inquiry process of any search for knowledge or research with experience which was



given prominence (Morgan, 2014). The pragmatic philosophical underpinning permits the researcher to seek answer for research questions that cannot be addressed via a mono-method studies especially in the context of examining a complex and multi-faceted research topic (Doyle *et al.*, 2009) like school building maintenance. Hence, mixed methods approach bestows the best opportunities for answering the research questions (Johnson and Onwuegbuzie, 2004).

In the current context of research, the mixed methods offers the researcher to gain access to the potential wealth of both types of data with regards to school building maintenance to be explored. This is founded on the researcher's opinion that knowledge is constructed on pragmatic foundation (Creswell *et al.*, 2003) and that truth is '*what works*' (Howe, 1988, p. 10) and hence '*methods can and should be mixed*' (Wellington, 2000, p. 17). With this in mind, the researcher believes that quantitative and qualitative methods are compatible, hence, numerical as well as text data collected can assist in better in-depth understanding of the subject in hand (Denzin and Lincoln, 2000; Ivankova, 2004), which in this case is school building maintenance. What the mixed methods offers to this study is the ability to deliver a comprehensive collection of data in multiple form on school building maintenance for analyses (Turner III, 2010), paving way for the use of triangulation to be exercised in the data analysis adding '*rigour, breadth, complexity, richness and depth*' (Denzin and Lincoln, 2000, p. 5), thus further enhancing the reliability and validity of the study.

### 3.1.2 Type of mixed methods

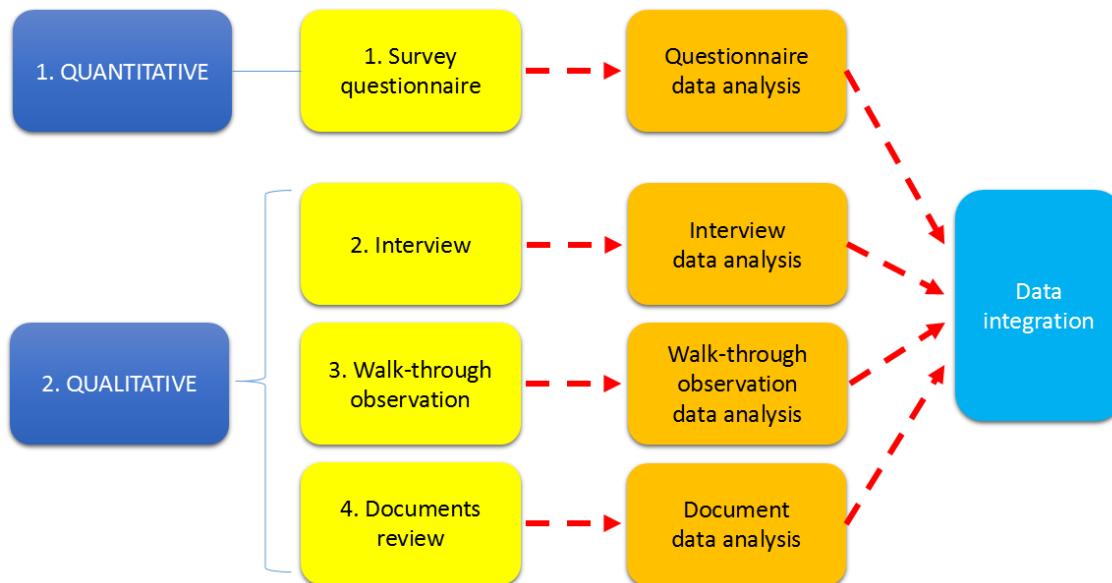


Figure 3-1: Mixed method design of the study

As illustrated in Figure 3-1, the current study employed a sequential explanatory mixed methods design, which comprised of two separate parts (Creswell, 2014). In the first part, the quantitative data was collected with a broad survey via a questionnaire in order to generalise results to a population (Creswell, 2003). This was followed by the second part when it focused on qualitative data to collect detailed views from participants (Creswell, 2003). This type of data was gathered using individual semi-structured interviews (individual/group). In addition, walk-through observation of each school as well as documents review were also utilised. In the context of this study, priority is accorded to the quantitative data as it was done first, and the two parts are subsequently integrated during the interpretation phases of the research (Creswell *et al.*, 2003). The justification for this approach is that the numerical information and results paints an overall picture of the research problem, whereas the textual information and its analysis will enhance and clarify those statistical results by investigating participants' views in more detail (Creswell, 2003). In the context of this research, this is later explained in detail in section 3.7.

### **3.2 Position of the researcher**

It is argued that it is best that the researcher adopts a '*marginal position*', where one is neither totally an outsider nor totally an insider (Hammersley and Atkinson, 1996, p. 112). To a certain extent, my position as the researcher somewhat fits this description. To most of the participants, especially in all the schools, I was viewed as outsider – a local student researcher from an overseas university. At the same time, when conducting the research, I consider myself as an insider. This perhaps stems from the insider position that I can also locate myself, derived from my cumulative personal experience in the local Malaysian setting occupying the roles as follows: as a secondary school student; a secondary school teacher; and an education officer. As such, I can relate to the opinions that were relayed by the different participants, especially during the interviews.

As the research also depends on establishing and maintaining relationship (Hammersley and Atkinson, 1996), I firstly introduced myself as a local student from an overseas university. In addition, I strategised by making an effort to relate to the participants by establishing some commonalities between myself and them in my introductory remarks. To the students, I emphasised on my status as a student, a position similar to theirs. Similarly, to the teachers, I relayed my previous teaching position held several years back. With the principals and officers, my working experience in the MOEM was also relayed during my initial visit. In my opinion, this strategy was valuable so as to establish closer rapport with the participants, while at the same time projecting to them the unique middle position I occupy in the outsider-insider continuum. It also helped in establishing a more relaxed atmosphere particularly during the initial moments of meeting them at the first time. Most importantly, it conforms to the ethical element of the research of transparency.

### **3.3 Population**

The target population in this study are the individuals who are directly or indirectly related to the subject of school building maintenance in secondary schools. Essentially, all participants in the current study represents the various

stakeholders involved in such matter, namely, administrators and end users, each of which is further discussed in the subsequent paragraphs.

The underlying rationale of the inclusion of a variety of respondent types in the current study is based on the understanding that *'any single perspective is likely to be partial, limited, perhaps even distorted, and only by honouring multiple perspectives can knowledge quest be fruitfully advanced'* (Wilber, 2000, p. 167). In the context of the current study, each different stakeholders would bring into the study their own perspectives on the issue of school building maintenance, thus enabling a more enriched and perhaps holistic view on the matter. Borrowing from underlying constructs of the Mosaic approach (Clark and Moss, 2001; Clark and Moss, 2005), what this means is the data gathered using different research instruments symbolises different tiles in a mosaic which can be assembled to compose a bigger and more detailed picture of school building maintenance.

### **3.3.1 Administrators**

These groups of people consists of the main personnel who are involved in or responsible for the management of the school building condition and its maintenance. These administrators in the current study are represented by the education officers and principals as explained in the following sub-sections:

#### **3.3.1.1 Education officers**

This first subgroup of administrators consists of education personnel who are at the middle or higher level of the Malaysian education management structure, namely the state education department and MOEM. Their inclusion as participants in the study is based on several rationales. Firstly, it is related to their roles and responsibilities for the management of the school physical condition including maintenance, which make them the expert. Secondly, this particular group of administrators' perceptions on the school building maintenance could be said to be overlooked by other similar studies, despite the fact that their insights are reasonably valid due their aforementioned roles and responsibilities. This is particularly true in the local Malaysian context,

where previous study on school building maintenance only involve the District Education officers as their participants (Yong and Sulieman, 2015).

#### **3.3.1.2 Principals**

This second subgroup of administrators, primarily comprises of the principals and senior assistants of the secondary schools, who are responsible for running the school. These representatives of the school leaders are selected based on several grounds.

Firstly, the principals are the CEOs of the school buildings (Crampton *et al.*, 2004), hence they are in charge of the school building care (Lipham and Hoeh, 1974) and are ultimately responsible for the appearance and condition of their schools (Thompson *et al.*, 2013). In addition, as the school facility managers (Knezevich, 1975), they are also the ones responsible for supervising the school building maintenance (Sharp and Walter, 2012). Secondly, as educational leaders at the site level (Crampton *et al.*, 2004), they have the duty to ensure that these building are well maintained (Thompson *et al.*, 2013) so that the whole school environment is conducive to student learning (Crampton *et al.*, 2004). Thirdly, they are essentially instructional leaders of the school who are likely to be well placed to make decisions in the aspect of planning, management and assessment of their school building (Duyar, 2010). Fourthly, their selection as participants in the current study is deemed appropriate based on their inclusion in several previous school building research in international (Stevenson, 2001; Chaney and Lewis, 2007; Kumar *et al.*, 2008; Harrison, 2010) and Malaysian (Mat Nah *et al.*, 2012; Yong and Sulieman, 2015) contexts. Being educators themselves, they can appreciate the potential effect of the physical environment in relation to their student's academic achievement, as well as understand the positive signal a well-maintained school building conveys to the school community and beyond (Crampton *et al.*, 2004).

#### **3.3.2 End users**

As the name suggests, this particular group represents the main users of the school building, who are directly affected by the school building physical condition and subsequently, its maintenance. It is based on the premise that in order to find new directions for school improvement, the starting point should be

the classroom itself and the exploration of teaching and learning '*through the eyes of those most closely involved - teachers and young learners*' (Flutter and Rudduck, 2004, p. 2). Similarly, it has also been posited that the engagement with the learning environment users and other stakeholders is essential '*to enrich understanding of how, and how effectively, environments support educational and other objectives*' (von Ahlefeld, 2009, p. 1). Furthermore, it is observed that most empirical school building research typically examines two users' perspectives of teachers and learners (Watson *et al.*, 2014), as both groups are aware of their school physical environment and form views about it (Burke and Grosvenor, 2003; Burke and Grosvenor, 2015). In order to provide further clarification, the justification of these two primary groups of end users are discussed in the following sub-sections respectively.

#### 3.3.2.1 Teachers

The basis for the selection of school teachers is based on the argument that teachers take on full roles as '*public intellectuals*' (Cochran-Smith, 2005) as well as '*change agents*' (Day, 2004). In such important roles, their perspectives of the school building maintenance is valuable considering the nature of influence the building condition has on their core business of teaching. Previous studies have also included their insights on the impact of school building in relation to various outcomes like retention (Buckley *et al.*, 2005), or attitudes about classroom (Earthman and Lemasters, 2009), satisfaction and success (Schneider, 2003) or school design (Jerome, 2012).

#### 3.3.2.2 Students

Not only students are significant stakeholders in education, and the key targets of policy changes (Wood, 2003) but at the heart of the educational process lies the child. The Central Advisory Council for Education (England) (CACE) Plowden Report highlighted the tendency of past school building consultations which focuses on educators has led to some missed opportunity for the students' direct involvement in the matter (Woolner, 2005). They may be one of the school clients, but their voices are the most significant and need to be considered (Ghaziani, 2008). The rationales to include the pupils in the research are as follows:

Firstly, previous research have informed us that tuning into the students' perspectives are of immense significance to both practitioners and schools (Flutter and Rudduck, 2004). This is perhaps because the students' feedback on the present learning condition in the school can provide valuable information with regards to the aspects of the school environment and their effects on learning (Flutter, 2006).

Secondly, the fact that these students represent one of the typical end users (Leung and Fung, 2005), who individually spend on average 6 hours a day, 5 days a week, 190 days equivalent to 1,158 hours annually in schools in Malaysia, does substantiate this argument further as they are also considered expert witnesses in the school improvement process (Rudduck, 1999). Such argument is supported further by Roberts and Nash (2009) who state that students, who make up 95% of the school population, are often bright, vibrant young people who have much to offer, yet rarely given an opportunity to take the initiative to improve their school and instead become a passive recipient of policy and practice rather than active agents of change. This is evidently so in the context of Malaysian school building studies, which is not only limited as alluded earlier in section 2.3.3, but the inclusion of students is also virtually non-existent.

Thirdly, as argued by von Ahlefeld (2009, p. 2), *'it is perhaps self-evident that if the students are central to learning and the mission of schools, then they would have a lot to say about their school environments'*. This is further substantiated by previous research that have demonstrated that students know their school grounds well (Architecture and Design Scotland, 2014). Hence they possess a huge amount of knowledge on their school environment and as such they can offer valuable information to researchers (Ghaziani, 2008).

Last but not least, it is also posited that *'children are competent and active members of society, who can and should have a say in aspects of social life that concerns them'* (Newman and Thomas, 2008, p. 238). Therefore, student voice has a legitimate perspective, presence and active role (Cook-Sather, 2006). From their voices, teachers, curriculum designers and policy-makers can gain genuine knowledge to better match future directions in education with the expectations and perspectives of the students (Robertson and Walford, 2000).

Listening to children leads to better decisions, as they possess a body of experience and knowledge that is unique to their situation and hence, produce their own views and ideas (Lansdown, 2001). Their perspective, in turn, would enable a focus on the physical dimension of a school environment which provide opportunity for students to help improve a tangible aspect of their learning environment in schools (Flutter, 2006).

With regards to educational reform, paying attention to students' opinions is vital as it offers an essential foundation from which the education leaders can develop informed opinions and take practical actions for school change. These opinions represent a valuable opportunity for these decision makers to better understand what students think, experience, feel and know, consequently leading to more informed decision making (Fletcher, 2012). This is significant especially about matters that affect students' learning which policy makers have the authority and power to change, of which school building maintenance seems to fit such description (Phelan *et al.*, 1992).

### **3.4 Sampling strategy and participants**

For this study, purposive sampling was adopted, which implies deliberate selection of individuals as research participants to learn to understand the central phenomenon (McMillan and Schumacher, 1994; Miles and Huberman, 1994). This is due to the underlying argument that the chosen study participants are most likely to provide relevant and valuable information (Maxwell and Lumis, 2003), which in this case is related to the issue of school building maintenance. As such, the researcher drew on special knowledge or expertise gained from his professional work experience to select subjects who represent this population (Berg, 2009).

#### **3.4.1 Selection of study location**

In terms of the study location, the samples of were drawn from the state of Selangor (18 schools and 1 agency) and Federal Territory of Putrajaya (4 agencies) as shown in Figure 3-2. These were selected for a number of reasons. Firstly, the state has 275 secondary schools, which is the highest number in the country, representing 11% of the total of 2,367 Malaysian





condition and location. Inevitably, the schools vary in terms of the level and type of education they cater to.

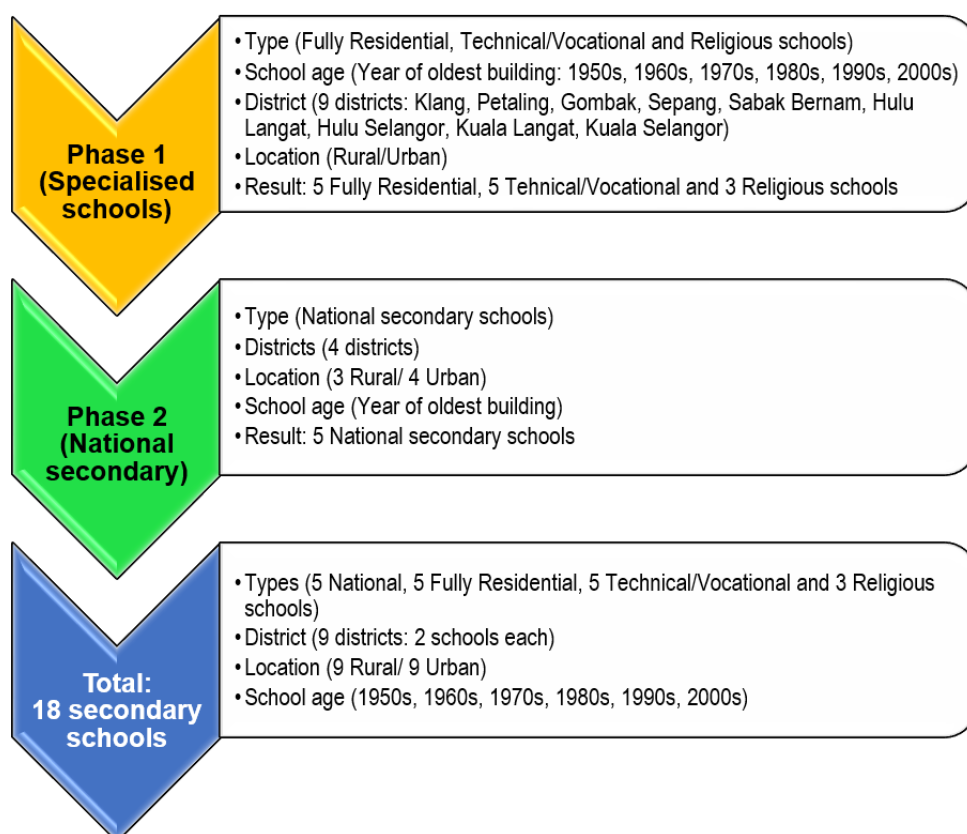
However, the focus of the current study is on secondary schools based on the following grounds. Firstly, there are more diverse and different types of secondary schools in Malaysia as aforementioned in Table 1-1, which are managed by separate agencies. Secondly, the secondary schools are typically larger in terms of their physical size and number of buildings due to their enrolment size and different subject areas (Dudek, 2000) that require more specific learning spaces like science laboratories and workshops. Thirdly, the secondary school is chosen due to the characteristics of its associated end user participants, particularly the students' higher maturity and independence level, as they are usually considered to be more outward looking and interested in the wider social and spatial environment (Dudek, 2000). Finally, due to the specialised nature of secondary education, its students frequently move around their school buildings to different learning venues (Dudek, 2000).

As the research is aimed at studying only major types of secondary schools as aforementioned in section 1.2.4, the selected type of schools corresponds to each of the four primary types of Malaysian secondary schools as follows: a) National secondary schools; b) Fully residential secondary schools; c) Technical/Vocational secondary schools; and d) Religious secondary schools. With regards to the selection method of these school types in the state of Selangor, this was carried out in two phases as shown in Figure 3-3. The underlying basis of the school selection is aimed at diversity and variance in terms of ranges of school type and building age, while also taking into consideration a fairly equal representation of schools in terms of district (2 schools per district) and locations (rural/urban).

As shown in Figure 3-3, the first phase involved the selection of the specialised schools (Fully Residential, Technical/Vocational and Religious) due to their limited numbers situated within Selangor state. In order to select them, firstly, all these schools within Selangor were listed using MOEM data. The result revealed that there are eight Fully Residential secondary schools, seven Technical/ Vocational secondary schools and three Religious secondary schools in Selangor (Ministry of Education Malaysia, 2013b). Next, using a

matrix of the year the first school building was built (1960's, 1970's, 1980's, 1990's to 2000), the districts in Selangor state (9 districts) and location (urban/rural), the samples for the study are selected. This is undertaken to enable relatively equal representation of these schools in terms of their building age group, each district and location category. At the end of this first phase, a total of 13 of these three types of specialised schools were selected, representing eight districts, with seven urban and six rural locations. From this total, the five Fully Residential secondary schools represent five districts, three of which are urban and two rural locations. Meanwhile, the five Technical/Vocational secondary schools come from five districts, three of which are urban while two are rural. With regards to the Religious secondary schools, all three were chosen automatically because they are the only ones of that school type located within the state. They represent three districts with one urban and two rural locations.

Next, the second phase as illustrated in Figure 3-3 involved the selection of five national secondary schools. Firstly, the school list from Phase 1 was examined to ensure that each district is equally represented by two schools. From this examination, it showed that four more districts within the state of Selangor are under-represented, namely Petaling, Sepang, Hulu Selangor and Kuala Langat. In addition, there is also a need to equally represent the school location (urban and rural). Thus these two combined criteria (district and location representation) formed the next step in shortlisting the possible national secondary schools. Next, from this shortlisted schools, the schools' building age is taken into consideration as a determining criterion. As a result of Phase 1 and 2, 18 secondary schools were selected for the purpose of this study, which was suited to the resources and scheduling of two days in each school within a period of three month from Jun to September 2015. The detailed school summary profiles and each school layout plan are described in Appendix 4 and Appendix 5 respectively.



*Figure 3-3: Selection procedure of schools in the study*

### **3.4.3 Selection of agencies**

The inclusion of education officers who represent the education agencies was based on the understanding that a school is situated within a larger context of the educational system as described earlier in section 1.2.6. Furthermore, with the centralised nature of Malaysian education system (Ministry of Education Malaysia, 2015a), any decisions with regards to school building maintenance will inevitably involve the education agencies, either at the district education office, stated education department or MOEM divisions as shown. Hence their inclusion in the current study is critical in order to gain a multitude of viewpoints and representation at this level of administration. To this end, the sample participants were drawn from five selected agencies, each of which is directly or indirectly involved in the school building maintenance for the types of schools selected for this study. The detailed summary of the selected agencies is provided in Appendix 6.

#### **3.4.4 Selection of participants**

The selection of sample education officers was primarily based on their occupational position as well as knowledge and expertise in relation to school building maintenance issue. They are individuals who are involved in the school building development and maintenance in their current official capacity within their respective agencies. The intended sample was two officers for each agency.

With regards to the selection of sample participants of principals, they consist of school principals where possible, or senior assistant principal available. This selection method is deemed more practical especially in the light of past experience where the principal is unavailable. As expected, three principals of the technical/vocational schools were not in the school premises as they were involved with official courses, and hence were substituted by their respective senior assistant. Nevertheless, each school was represented by their respective school leader.

With respect to the selection of teachers, they were chosen based on mixed criteria: years of teaching service, years at the school, subject taught, and mixed gender, thus enabling a variety of perspectives are represented in the study (Gislason, 2010). This criteria list was given to the principals prior to the school visit in a formal letter and reaffirmed during the discussion in the initial visits to the school site to ensure smooth selection of 10 teacher participants for each school.

Finally, the student participants who were outlined by the researcher to be selected by the school leader was supposedly from one class of 30 upper secondary (Form 4) students aged 16+ years old as explained during the initial visit to the schools. This is based on their perceived maturity and independence level (Dudek, 2000) and length of attendance in their respective schools. Furthermore, they are also inclined to be more outward looking and aware of their wider social and spatial environment in schools (Dudek, 2000). Moreover, this is to abide by the guidelines set forth by MOEM, pertaining to the exclusion of student participants who are involved in the public examination for that particular year. Although the majority of the students selected were from the initially intended age group, there were certain exceptions with the inclusion of

the other age groups in some schools by the principals. Nevertheless, such inclusion helps to increase the age variance of the sample of student participants as explained later in the next chapter in section 4.1.2.

In sum, the purposive sampling selection is deemed justified and fit for purpose in relation to the aim of the study and research questions. This is because they are the ones who will best answer the research questions and who are ‘*information-rich*’ (Patton, 1990, p. 169). In addition, they are experts of the school and its facilities with their experience and knowledge about the school and what works (Architecture and Design Scotland, 2014). Besides this, the combination of such a mix of respondent types of different stakeholders, with perhaps different ways of seeing and experiencing the school buildings, is aimed at eliciting a rich and diverse source of insights and ideas from multiple perspectives (Wilber, 2000). As alluded to above, some substitution and inclusion of participants occurred during the fieldwork, due to unexpected circumstances beyond the researcher’s control, which is a reality in the research.

#### *3.4.4.1 Sample participants for questionnaire*

The sample participants for the questionnaire were identified by the school leader or the agency head, based on the criteria as aforementioned in section 3.4.4. The summary of the actual sample participants in the survey is shown in Table 3-1.

Respondent type	Questionnaire participants
Education officers	11
Principals	18
Teachers	180
Students	523
Total	733

*Table 3-1: Questionnaire participants of the study*

The number of teachers and students are less than expected. For the teachers, this is attributed to how the survey was conducted, as the questionnaire was not personally administered at the school's request. For the students, the shortage is due to the variation of numbers within a class selected by the school.

#### *3.4.4.2 Sample participants for interview*

In terms of selection procedures of schools that were going to be involved with the second phase of the study (interview), two schools were selected to represent each school type. A convenience sampling approach was adopted and was characterised by the accessibility and proximity of the schools to the researcher's home base in Klang. This enabled the verification of the interview data to be undertaken more efficiently within the constraint of available resources and time. From the list of participants involved at the first stage (questionnaire), selected participants were chosen by the school leader or head of agency at random to participate in the second part of the research (interview) as shown in Figure 3-4.



*Figure 3-4: Interviewee selection process in the study*

All the participants were informed via the questionnaire session briefing and survey informed consent form. This was further reinforced during the explanation by the researcher with the briefing stage prior to the questionnaire session. The summary of the interview participants is shown in Table 3-2, while their details are described in Appendix 7.

Respondent type	Interview participants
Education officers	5
Principals	9
Teachers	8
Students (8 groups of 6)	48
Total	70

*Table 3-2: Interview participants of the study*

Although the original intention was to include only two schools to represent each school type in the interview phase, during the questionnaire session with one of the religious school principals, she expressed a lot of interesting comments, particularly her personal interest in maintenance at home. This prompted the researcher to ask for her permission to include her as an interviewee, to which she subsequently agreed.

### **3.5 Data collection**

As the current study utilises the mixed-method approach, the primary data collected was from the combination of the following: a) questionnaire; b) semi-structured interview; c) walk through observation (school only); and review of official records. However, before these are explained in detail, the data collection phases that were adopted for the whole fieldwork of this study needs to be clarified.

#### **3.5.1 Data collection phases**

Before the fieldwork could be undertaken, the necessary primary approvals from the Prime Minister's Office and MOEM (Appendix 8) were gained. In addition, respective approval from the individual agencies involved in the study was also requested and granted. Besides that, the permission and approval from the Newcastle University ethical committee (Appendix 9) was also gained.



With regards to the duration of the research, the fieldwork data collection was carried out in a three months period as shown in Appendix 10. This is circumscribed by the condition of three months as the maximum limit specified for fieldwork period set by the researcher's sponsor, namely MOEM. In terms of the chosen months of the year, June to September were deemed most suitable and practical months to undertake the fieldwork as Malaysian schools just commenced schooling after the school break. In addition, the schools were also not packed schedule-wise with many activities or functions, especially school tests or examination, as it was in the middle part of the academic year. During this fieldwork period, the following three phases of the data collection process as illustrated in Figure 3-5 were adopted for all the schools and agencies involved in the study:



*Figure 3-5: Fieldwork data collection phases of the study*

As shown in Figure 3-5, firstly, prior to the data collection, a formal written request was sent to each school (registered letter) (Appendix 11) and agencies (email) informing the principals and agency directors accordingly on the purpose of the study and tentative dates (two days maximum) of the proposed actual fieldwork visits. Attached with the letter were the relevant approval letters (Appendix 8), University support letter (Appendix 12) and details concerning criteria of participants (Appendix 13) and the research information sheets (Appendix 14). This was undertaken on the ethical grounds that an official notice should be given prior to the initial visit as formal communication means and professional courtesy to all the selected schools and agencies.

A week or two before each school and agency fieldwork visit, the researcher went to each school and agency and met with the principals and agency leaders respectively. During this initial visit, all the details of the actual data collection days were explained and agreed upon, which included details concerning

criteria of participants, dates, time and venue. Besides that, the research documents like information sheets and consent forms (Appendix 14) were also given, in order for the schools and agencies to make the necessary arrangements ahead of time. This coordination is particularly vital in order to minimise disruptions in the daily operation of the schools (Sanoff, 2001) as well as to ensure the availability of the officers concerned in the agencies. The initial visit was also aimed at establishing rapport with each of the schools and agencies, thus paving the way for ensuring a smoother and successful data collection process.

From the discussion with the school principals and officers, most of them were very appreciative with the fact that early notification via the letter and prior personal initial visit were made before the actual data collection dates. According to them, such approach by the research indicates the seriousness and commitment of the research. In addition, it enables ample time for the school to identify and organise the study participants beforehand, particularly suitable time and venue for the actual data collection days. As a result, the tentative dates that were finally selected for each schools were fairly adhered to during the actual data collection duration, with only some minor adaptations to accommodate the school programs already planned.

### 3.5.2 Data collection methods, justifications and procedures

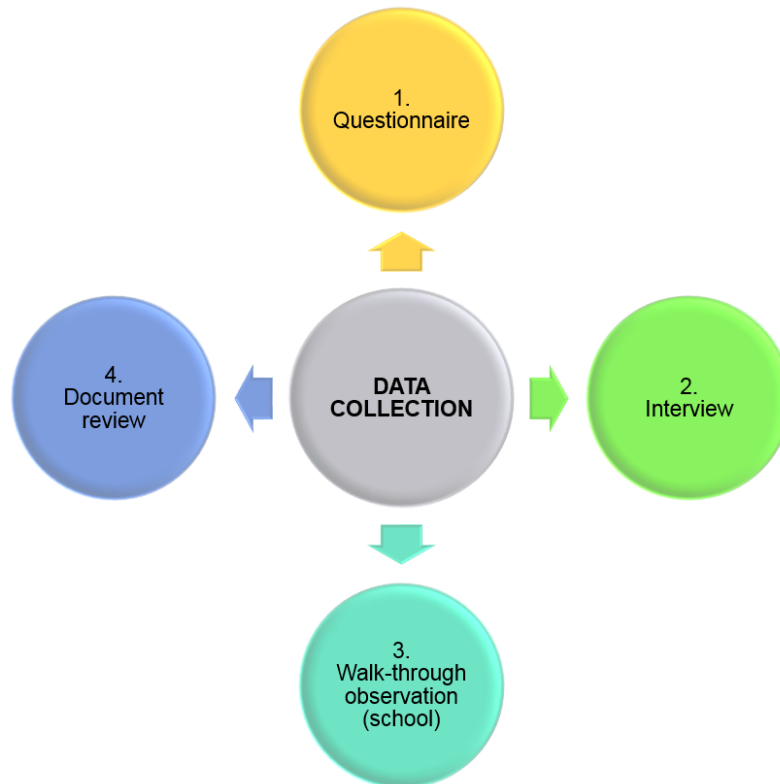


Figure 3-6: Data collection methods of the study

As stated earlier in section 3.5, the data collection methods involve four main elements as shown in Figure 3-6, namely questionnaire, interview, walk-through observation and documents review. In terms of the order of each method, the survey questionnaire was conducted first. Next, selected participants who had completed the questionnaire were interviewed. Then, the walk-through observation was carried out within the school premises. Subsequently, the documents review was undertaken. In each venue, the quantitative data collected was not analysed and collated prior to the qualitative data collection stage due to the constraints of time, accessibility and practicality. In the following sub-sections, each of these are discussed respectively, along with its justifications for choice and its procedures adopted in the study.

#### 3.5.2.1 Questionnaire

Questionnaire is defined as ‘a written list of questions, the answers to which are recorded by respondents’ (Kumar, 2005, p. 126). In terms of collection for the

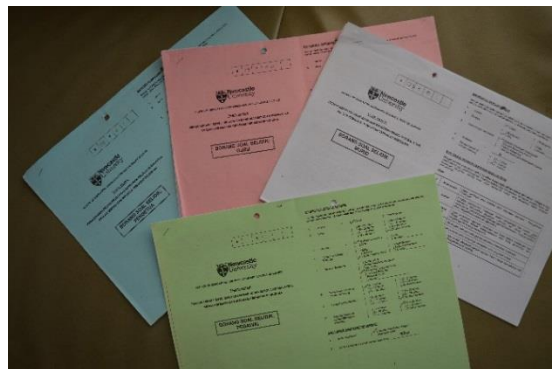
quantitative data in this first phase of the research, a survey questionnaire was used as the most suitable instrument based on the following grounds.

#### *3.5.2.1.1 Justification for use of questionnaire*

Firstly, the use of questionnaire as a data collection method is because of it is comparatively convenient and inexpensive (Kumar, 2005). Secondly, it also offers anonymity for the respondents (Kumar, 2005). Thirdly, questionnaire offers an efficient use of time as it can be completed by respondents in their own time (Munn and Drever, 1990) as well as being easy to collect, code and analyse (Fink and Kosecoff, 1996). Fourthly, information can also be gathered from a large number of people simultaneously (Munn and Drever, 1990). Fifthly, administered questionnaires offer the likelihood of a high return rate (Munn and Drever, 1990). Sixthly, in a questionnaire, all respondents are presented with the same standardised questions which offer consistent stimuli to the respondents (Munn and Drever, 1990), thus, a high reliability of response is also obtainable (Robson, 1993). Lastly, previous research also has utilised questionnaire as the chosen instrument that makes it possible to obtain information regarding the school building and its contents (Almeida, 1985) and make comparisons across studies.

#### *3.5.2.1.2 Questionnaire items*

The data collection utilised four different sets of questionnaire for the four groups of respondents. In order to ensure there will be no confusion on appropriate sets for each group of participants, the questionnaires were printed in different colours as shown in Photo 3-1. The first set of questionnaire (Questionnaire Set 1) will be used for the administrators, namely the education officers (green) and school principals (blue) as shown in Appendix 15.



*Photo 3-1: Colour-coded questionnaire of the study*

The questionnaire aims to address the following research objectives of this study as follows: (a) examines the current policy, procedures and mechanism of school building maintenance in Malaysian secondary schools; (b) establishes the key challenges of school building maintenance in Malaysia; and (c) assesses the level of satisfaction of the administrators and end users on the school building condition and maintenance.

The second set of questionnaire (Questionnaire Set 2) was used for the end user group, namely the teachers (pink) and students (white). It is aimed at answering the research question on assessing the level of satisfaction of the end user on the school building condition and maintenance. This is based on the understanding that the quality of environment will always be determined by the users of the facilities (Alexander, 1992) and any evaluations of school buildings should be oriented to a certain extent to user satisfaction (Ornstein and Moreira, 2008).

The questionnaire in this study was developed utilising a combination of literature (Sanoff, 2001), previous empirical research (Yiles, 1950; McGuffey, 1974; Cash, 1993b; Moulton Jr, 1998; Lavy and Bilbo, 2009) and actual survey (Wisconsin Department of Public Instruction, 1999; US Department of Education, 2013). Some adaptations were made where necessary to cater for the aim of this study in the Malaysian context.

The questionnaires consists of two types of questions namely closed questions and open-ended questions. The former would comprise of the following types: dichotomous; multiple-choice; ranked-order; contingency; matrix; and scaled. There is one 'any other comments' general open-ended question at the end section of the questionnaire, which is most commonly used (O'Cathain and Thomas, 2004). The underlying rationale for its inclusion in the questionnaire is to offer the respondents an opportunity to voice their own personal opinion (O'Cathain and Thomas, 2004) and thus explore alternative responses (Reja *et al.*, 2003). Besides that, it acts as a safety net against any missing vital issue of the study not covered by the closed-ended questions (O'Cathain and Thomas, 2004).

With regards to the language, the survey questionnaire was prepared in dual language, namely Malay and English. This is done to allow the study participants to select their preference for understanding and answering the questionnaire, as well as making them feel more comfortable during the research process (Blerk, 2006).

As piloting is an important phase to identify problems and refine the items, the questionnaire was pilot tested on officers, principals, teachers, and students who were similar to the target sample and population to examine the validity of the instruments prior to survey on a larger scale. Due to the issue of accessibility to personally administer the survey, the questionnaires were emailed to two education officers, two principals and two teachers, with instructions to complete, evaluate and make any relevant comments if necessary about the questionnaire. In addition, two teachers and two students were also given the questionnaires which were personally administered to gain some direct personal responses. Among vital elements checked during the pilot survey are the content, the subject's understanding of the question, the question sequence, flow and naturalness of the sections, duration and timing, as well as the respondent's interest and attention (Hartas, 2010). The questionnaire was adjusted to address any problem discovered in the pilot test to finalise the questionnaire to be used in the study.

#### *3.5.2.1.3 Questionnaire procedures*

The final version of the questionnaire was administered by the researcher in a collective manner according to the individual groups involved at the allotted venue. For the education officers, the survey venue would be in their office, during office hours, with the permission from the head of agency, whereas for the principals, this was carried out in their respective office. Meanwhile, the group survey for teachers and students was held separately at different times in the school library during school hours, with prior permission from the Principals as shown in Photo 3-2.



*Photo 3-2: Group questionnaire session in a meeting room (S06)*

Prior to completing the questionnaire, each group of participants was given a short briefing during which the important aspects of the research were highlighted, in particular, the ethical issues including the right to withdraw and not to participate and the process involved. With each individual set of questionnaires given, participants were given the individual information sheet, informed consent form and explanatory cover letter guaranteeing confidentiality and anonymity as well as detailed instructions for completing the questionnaire. Approximately 25 minutes were allocated to the participants to complete the questionnaire. The researcher was on hand in the room to offer assistance to participants if required, for instance, explaining the meaning of questions and how to record the answers in the survey as shown in Photo 3-2. The completed questionnaires were collected by the researcher at the end of the survey, put into a sealed envelope and kept safe during transport and storage.

However, for two schools (S01 and S03), the survey for teachers were not able to be administered personally. This was because the principals in these two schools preferred the option of leaving the questionnaire with them and administering the questionnaires themselves. This was indicated during the initial visits to the school. In such cases, the researcher then handed the questionnaires in a sealable envelope to the person who was assigned to be in charge of this task in each school. The researcher then explained the process of administering the questionnaire, reminding the principals on the need for confidentiality and related ethical issues including the security of the completed

questionnaire which needed to be kept in the sealed envelope and locked cabinets.

#### 3.5.2.2 Interview

For the purpose of collecting data in the second phase, the most regularly used method of data collection in qualitative research (Gillham, 2005; King and Horrocks, 2010) namely interview, was chosen for this research. An interview is defined by '*any person-to-person interaction between two or more individuals with a specific purpose in mind*' (Kumar, 2005, p. 123). In the context of research interview, as the term '*an inter-view*' implies, knowledge is constructed via the interviewer and interviewee interaction (Kvale, 2007, p. 1). Nonetheless, Kvale shares Kumar's (2005) opinion as he elaborates further that interview possess a structure and a purpose governed by the interviewer - as a powerful key to delve into the ways in which respondents experience and understand the world (Kvale, 2007). In addition, the interview method is the most frequently used instrument for assessing people's reactions to a school's physical setting (Sanoff, 2001).

In the context of this study, apart from quantitative data in a form of questionnaire survey, a follow up personal face-to-face interview, was conducted with selected representatives of the education officers, principals, teachers and students in order to examine the issue of school building maintenance further. The use of interview is chosen as it enables the researcher to personally witness and '*document the school building performance and the resulting delight, disgust, passion, pleasure, fear and happiness*' of the people involved (Watson and Thomson, 2004, p. 4). Thus, it makes explicit the relationship between building and people by conveying how they see the building and how they are affected by the building (Watson and Thomson, 2004). Face-to-face interviews were selected for several reasons as follows.

##### 3.5.2.2.1 Justification of interview

Firstly, it involves the level of complexities of the research issue involved (Kumar, 2005; Sekaran, 2005), which in this case refers to school building maintenance. The face-to-face interview was used as it offers rich data and opportunity to create rapport with the interviewees (Sekaran, 2005).



The second advantage of using interview is because of its high response rate. This opinion is shared by Awang (2012) who posited that the respondents will less likely turn down the request for an interview, with a proper plan and approach. In the Malaysian context, the local culture of entertaining interview when someone comes to the door with polite and peaceful manner is upheld (Awang, 2012). He further argued that when approached in person, people will usually respond with good gesture and provide accurate responses (Awang, 2012). This is because people are generally more inclined to commit an hour and a half interview than to answer a fifteen minute questionnaire (Gillham, 2000). Central to this idea is the fact that '*people like the attention, they like to be listened to, they like their opinions being considered*' – all of which are part of the human needs, and a great strength of the interview is that it satisfies them (Gillham, 2000, p. 15).

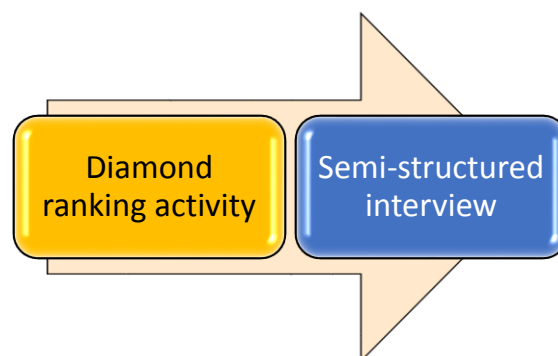
Another noteworthy advantage of interviews are that they can explain the questions, clear doubt and also add new questions (Sekaran, 2005). As such, the data is going to be more relevant as the face-to-face interview permits the interviewer to clarify terms or anything which might puzzle the respondents (Awang, 2012). The option to use visual aids to clarify points (Sekaran, 2005) during the interview, would also be particularly beneficial while endeavouring to elicit the thoughts and ideas that are problematic to express especially in the context of the current research topic of school building maintenance. As the following section 3.5.2.2 would elaborate, this option was utilised by the researcher.

Finally, as the interview method tolerates flexibility in terms of adapting, adopting, and altering the questions as the researcher continues with the interviews, which is also an advantage in itself, such characteristic also would allow a rich data to be acquired (Sekaran, 2005). Such data is of significant value (Creswell and Clark, 2007), as the validity *vis a vis* accuracy of their accounts is commonly accepted '*at least in relation to feeling, beliefs, attitudes and behaviour [as] after all, people 'know themselves'*' (Gillham, 2005, p. 7). In this research, the participant's thoughts, prejudices, perception and perspectives on school building maintenance of the school could be further investigated.

### 3.5.2.2.2 Interview procedures

In order to address the ethical concern with regards to confidentiality, suitable venues for the interview session were provided for each group, depending on the schools. For the education officers, their individual interview venue would be in their office during office hours, with the permission from their head of agency. Similarly, for the principals, the interviews were conducted in their respective office. Meanwhile, the individual interview for teachers and group interview for students were held in a designated secluded venue ranging from an air-conditioned meeting room to the school library during school hours, with prior permission from the school principals. In the case of the students, the reason that a group interview was chosen was due to ethical reasons, particularly in relation to their position of vulnerability as children.

For this study, a visual mediation approach was adopted for the interview session through the use of the diamond ranking activity. Essentially what this means is the interview session was conducted in two distinct phases, namely the diamond ranking activity and actual interview as shown in Figure 3-7.



*Figure 3-7: Interview phases in the study*

In the first phase of the interview session, a photo-based diamond ranking activity was conducted with the participants based on several arguments. Firstly, it is chosen due to its relevance in complementing the rank order questions which was asked in the initial questionnaire about ranking maintenance priorities. Furthermore, diamond ranking activity was considered appropriate for investigating people's experience of the school environment as evidenced by previous research (Woolner *et al.*, 2010; Clark, 2012; Niemi *et al.*,

2015). It also offered variety in terms of enabling participants to be more actively involved by doing and talking (O’Kane, 2000), besides being a suitable pre-cursor warm up session to ease them in for the subsequent full interview phase.

As shown in Figure 3-8, this was initiated by a briefing prior to the interview session, in which the important aspects of the research, particularly the ethical issues were re-emphasised and the different phases of the interview session as shown in Figure 3-7 were also clarified.

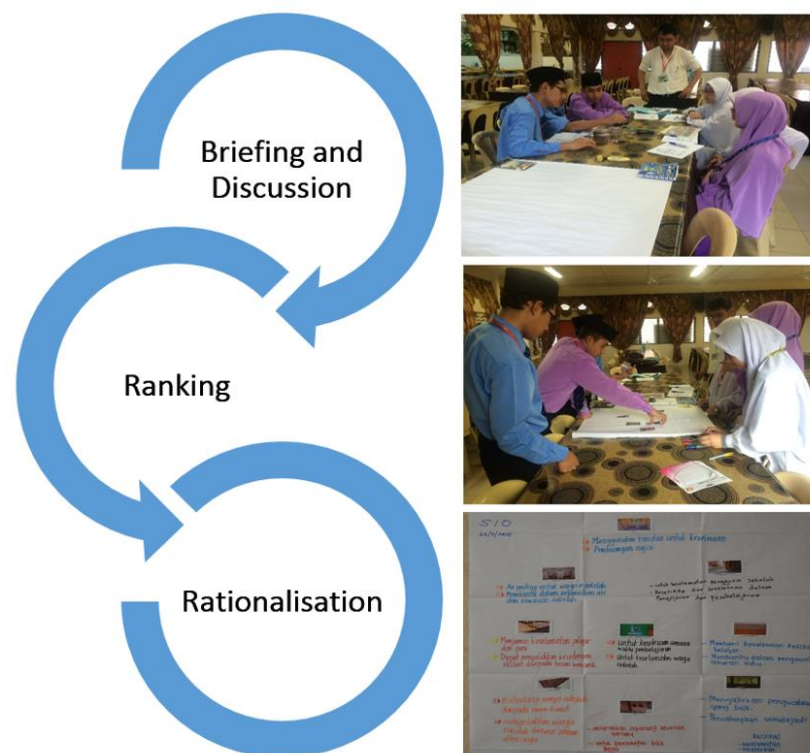


Figure 3-8: Diamond ranking activity process in the study (S06)

Next, the diamond ranking activity commenced in earnest where the participants were tasked with arranging the nine photos in a diamond rank order shape (Clark *et al.*, 2013) according to school building maintenance priorities as shown in the task sheet in Appendix 16. At the centre of this activity, a selection of nine photos depicting various school building maintenance aspects was the medium used to generate data (Petersen and Østergaard, 2003). These selected photos were based on previous research (Akasah *et al.*, 2009) and prior questionnaire piloting result aforementioned in section 3.5.2.1.2. These

photos were used as prompts (Bryman, 2012) or visual cues (Clark, 2012) to elicit thoughts and ideas (Woolner *et al.*, 2010) thus stimulating the discussion while simultaneously enabling them to visualise and concentrate on the aspects of school building maintenance and related it to their own school context. Moreover, they provide a visual scaffold to focus their discussion in making justification for the ranking. For the students, they have to come to a consensus as a group on the rank order. The end product of the exercise was the diamond ranked photos of maintenance priorities as shown in Appendix 17A-17D, besides the participants' verbal rationalisation of the rank order, as well as additional written annotation in the case of the students - all of which were included as valuable inputs to the study.

In the second phase of the interview session, the semi-structured interviews were conducted with the selected participants as shown in Photo 3-3. The semi-structured interview type was deemed suited for the study to gather similar information from the interviewees, albeit with a more flexible approach to adapt to their personality and circumstances during the interview session (Johnson, 1994).



*Photo 3-3: Student group interview session in the study (S06)*

In terms of instrument, the interview schedule as shown in Appendix 18 was used which specify the questions, their tentative sequence and the guidelines of what needs to be uttered by the researcher at the end and beginning of each interview (Gall *et al.*, 2003). The interview schedule contains a combination of pre-determined closed and open-ended questions which were driven by the research objectives of the study. The former type of questions usually requires

the respondents to answer in words or few sentences while the latter offers opportunities for additional information to be gathered (Iyer, 2008). In addition, probing question involving how and why were also utilised to elicit more detailed explanations (Iyer, 2008) with regards to pertinent school buildings maintenance issues as follows: awareness; policy; planning; process; form and mechanism; philosophy; level of knowledge and training; prioritisation; funds; support; role; current school building condition; satisfaction level; common issues and implications; challenges; and aspirations. The interview schedule was not identical as specific questions or aspects were chosen from the above list which is tailored accordingly to suit the respondents' type (officer, school leader, teacher and student). Each respondent type had their own interview schedule and prepared separately.

The interviewer for this study was the researcher himself. This is on the following grounds. It provided consistency of the instrument, namely the researcher, in collecting the data interview. It also provided an overall perspective and understanding of the topic, which was helpful during the data analysis.

Both the interview schedule and interviews were in the Malay language to suit the local context of the research. This measure was taken to enable better conveying of ideas and answers in a language the locals are competent and comfortable with.

During the interview, besides from note taking, audio-recording and photo recording were also carried out to collect the data. To this end, technological support in the form of two digital audio recorder and a digital camera, were utilised as a means of enhancing accuracy and data quality as well as enrich '*texture of reality*' (Stenhouse, 1978, p. 30). In addition, selected important points or phrases where relevant were noted down during the interview schedule while ensuring eye contact is maintained as much as possible to ensure smooth flow of the interview. At the end of the interview, respondents were also informed that they have an opportunity to review and, if necessary, correct the contents of the interview after it has been transcribed. These data was kept in a safe locked bag in a locked car boot after each use for travelling purposes. Later all of the data was kept in a secure cupboard.

### 3.5.2.3 Walk-through observation

As earlier mentioned in section 3.5.2, in addition to questionnaire survey and interview, a walk through observation was also carried out to assess the current building condition of each school by the researcher, with prior permission granted by the principals. These on-site observations are considered vital by the researcher to arrive at a solid understanding of the phenomenon of school building maintenance which is usually manifested in the physical appearance and condition of the school buildings.

During the observation sessions, in most cases, at least one personnel who was familiar or related to school building maintenance was assigned to accompany the researcher. Instrument-wise, a written checklist was used for the walk-through observation of the buildings in each school as shown in Appendix 19. The instrument was similar to the ones used in the questionnaire (Section A) which was developed by adapting established instrument from previous school building surveys, studies and review of related literature (Moulton Jr, 1998; Wisconsin Department of Public Instruction, 1999; Sanoff, 2001; Uline and Tschannen-Moran, 2008; Lavy and Bilbo, 2009; US Department of Education, 2013).

Relevant photographs related to the school building condition and maintenance were recorded using a digital camera during each school site visit. These photographs were taken around the school compound for several purposes. Firstly, it is to '*accurately record key features of the school environment and facilities*' (Weaver *et al.*, 2016, p. 17) of the schools visited. Secondly, these photos offer a form of visual evidence as additional means of corroborating (triangulating) the data collected from the participants. Thirdly, these photos help to illustrate the issues raised in relation to the school building condition (Scottish Executive, 2005). Finally, they present a real life context on the ground for the issues of the school building maintenance. Hence, they provide a contextualised understanding of issues which were expressed by the participants as indicated by the survey and interview data (Edwards, 2006).

To fulfil the overall ethical requirement of the research in this data collection, the digital camera was kept in a secured bag for travelling purposes. After each use, the camera is secured in the locked car boot. After the completion of the

shots in each school, the photos were transferred onto an external hard disk with password, which was kept in a secured cabinet in the researcher's home.

#### 3.5.2.4 Documents review

In addition to the aforementioned questionnaire, interview and walk-through observation of the school building, accessible official documents related to school building maintenance on site (offices/schools) were also reviewed based on their '*authenticity, credibility, representativeness and meaning*' (Scott, 1990, p. 6). Among others, these include official written documents, publications, circular directives, records, reports, school facility maintenance complaints forms, strategic or school improvement plan, minutes of meeting, school layout plan and others deemed relevant to the study.

In addition, with prior permission, several photographs of these documents were also taken during the process as shown in Photo 3-4. The rationale for this is that these could provide additional contextualised visual data cum evidence that could be utilised as a means of triangulation of the data collected from the participants.

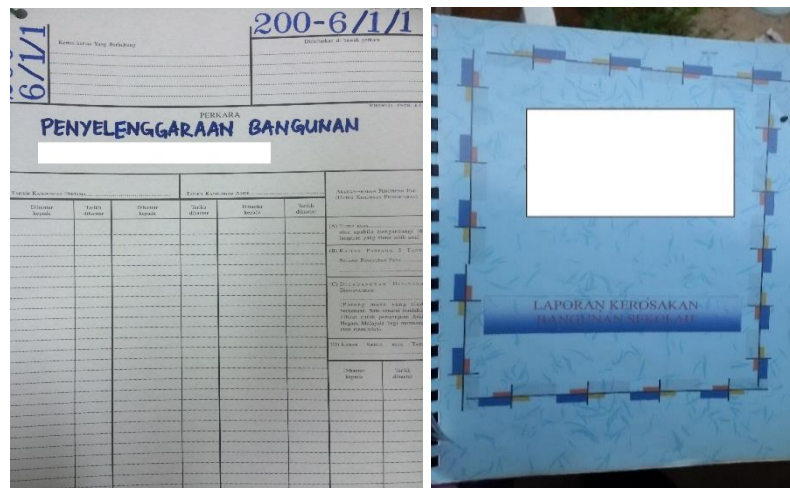


Photo 3-4: Sample of S10 school building maintenance file (left) and S05 complaint report book (right)

For document review purpose, a checklist was prepared as shown in Appendix 19 to act as a tentative guide for consistency for the researcher in reviewing the maintenance-related documents. Among the items contained in the checklist include the following: school physical development or school building

maintenance files; school development/maintenance committee; maintenance policy documents, maintenance complaint forms; and school plan.

### **3.6 Data analysis**

The data from various methods were analysed accordingly, each of which is described in detail in the following sub-sections.

#### ***3.6.1 Questionnaire data analysis***

The quantitative data collected via the questionnaire was analysed as suggested by (Pallant, 2013) using the Statistical Package for Social Sciences for Window Version 21.0 (SPSS). Firstly, a codebook was prepared. Secondly, the structure of the data file was set up. Thirdly, the survey data from all the questionnaires were entered into the data file systematically. Fourthly, the data was then screened for any errors or missing data and subsequently cleaned. Lastly, the survey data was analysed using relevant statistical and descriptive functions and graphs which would be discussed further in Chapter 4.

#### ***3.6.2 Interview data analysis***

On average, each individual interview for the adult was approximately 45 minutes, while each group interview with the students averaged 60 minutes. These included the verbal data both from the diamond-ranking activity and semi-structured interview.

The data analysis for the interview commenced with the transcription process undertaken by the researcher to familiarise and immerse himself with the data. Each of the interviews was transcribed into the Malay language to ensure that there is no dilution or confusion of the meaning. This transcription process was carried out one interview after another according to the respondents' type systematically. This approach is taken to ensure that each interview is transcribed and no interview is missed, using a checklist of interviewees as reference. For the interview data analysis, apart from conforming to ethical standards, the use of a pseudonym was adopted out of respect for the interviewees and avoiding respondents from facing any threats (Murphy and



Dingwall, 2011). Each interview was listened to bit by bit and slowly while the initial transcription was directly typed into a word document in Malay. As the interest was only on the contents, other language aspects like fillers and actions were omitted. After each individual transcription was completed, the recorded interview was listened to several times by the researcher and checked by the assistant to ensure nothing was missed. Next, the copies of the transcriptions were given to the participants to be verified.

The next process was the translation of Malay transcription of the interviews into English, which was time-consuming but necessary. As in other translation works, word for word translation was not possible at times. In such cases, the researcher used his local command of the Malay language and experiences as an English teacher to complete the translation work.

Then, qualitative interview data was analysed using the thematic analysis coding which is a process for encoding qualitative information that requires an explicit 'code' represented by a list of themes (Boyatzis, 1998). This task was carried out with the use of NVivo 10 software as a means of assisting the process in a more systematic and efficient manner. To this end, the word documents containing the transcription were transferred to the NVivo prior to the analysis.

In analysing the interview data transcripts, the adapted version of phases of thematic analysis suggested by Braun and Clarke (2006) was used with the use of NVivo. The first step was data familiarisation by reading and re-reading the transcripts. Secondly, using the questionnaire as its basis, some initial theme nodes (codes) in NVivo were created to start off the process. Thirdly, while the reading the interview transcripts, selected phrases of transcripts were collated and placed under this initial codes or theme nodes. Simultaneously new additional theme nodes at the same time were created to accommodate new relevant extracted phrases which was not present from the initial questionnaire. This process is repeated for each transcript systematically one by one according to the respondent's types in the following order: the officers; principals; teacher; and students respectively. Fourthly, after all these transcripts were completed, the associated theme nodes were merged into major parent nodes (Braun and Clarke, 2006) using the three main areas of the

study namely, current practices, key challenges and implications, in relation to the research objectives and topic of the study.

Throughout the above process of analysing and coding the data with the use of NVivo, the researcher utilised the memo function, which is essentially a note discussion with oneself (Bazeley and Jackson, 2012). This was valuable as it enabled exploration and note taking of ideas which emerged during the data analysis as one reads the extracts. This was later useful as reference and springboards in the data integration process and discussion of the findings. The inherent features of NVivo also enabled the collation of themes or nodes from the different respondent's types to be viewed at once, which also assisted the researcher in the process of data integration.

### ***3.6.3 Walk-through observation data analysis***

As mentioned earlier in 3.5.2.3, the data for the walk-through observation of each school were primarily in a visual form, namely photographs. The photographs were collated into individual files according to the respective schools where they were taken for easier identification. Where necessary, the photographs were collated into another file into themes.

### ***3.6.4 Documents review data analysis***

As alluded to in section 3.5.2.4, the data collected was guided by the prepared checklist for the documents review. These collected data from the visited site were in varying forms - written, graphic (Photo 3-4) and numerical. These data from multiple sources and sites were subsequent collated, analysed and synthesized to provide additional input to the study findings like the following examples: summary of school profiles (Appendix 4); individual school layout plan (Appendix 5); summary of school maintenance organisation (Appendix 20A); summary of school maintenance requests and projects (Appendix 21); and school complaint form (Appendix 22).

### 3.7 Data integration

After above mentioned different data were separately analysed accordingly, the next step is the data integration. The integrating through narrative method was employed for this study using the 'weaving approach' whereby the quantitative and qualitative findings are joined on a theme-by-theme basis (Fetters *et al.*, 2013), guided by the research objectives and overarching themes of the study namely the current maintenance practices, key challenges and implications.

In the initial data integration process, the survey results were given priority, providing the initial skeleton basis for the study findings by offering initial data themes, in the form of numerical representation from the survey. As earlier mentioned in section 3.6.1, where necessary further statistical examination was also undertaken to offer further details like comparisons between respondent types and connection between variables. These numerical data findings were then weaved together with the 'thicker' descriptions of the experiences and phenomena in the form of quotations and descriptions provided by the qualitative data from the interviews (Edwards, 2006) using the collection of vivid and compelling excerpt examples (Braun and Clarke, 2006). As earlier mentioned in section 3.6.2, as much as possible, the original un-edited interviewees' quotes were presented to give voice to the participants (Denzin and Lincoln, 2000) and enhance transparency (Scottish Executive, 2005). Essentially, the overall data integration process is akin to the process of adding flesh to the bones of the questionnaire responses data (Bell, 2005) with selective insertion of qualitative data from interviews, the walk-through observations and documents reviews undertaken in this study.

In addition, interesting and unique findings that emerged from the qualitative data analysis which were left uncaptured by the survey questionnaire were also utilised where deemed relevant to form additional themes to the findings. In such case, additional themes that emerged were added. Throughout the whole process of integration, *'the quantitative and qualitative data weave back and forth repeatedly around similar themes or concepts'* (Fetters *et al.*, 2013, p. 2150). The final product of the data integration described above could be discerned in the subsequent findings chapter of this study.

### **3.8 Validity, reliability and ethical issues of the study**

There are three other equally important aspects which need to be considered in any research. These are the issues of validity, reliability as well as the ethics of the study. In the following sub-sections, the validity and reliability elements are addressed first. Next, the ethical issues within the current study is also discussed.

#### **3.8.1 Validity and reliability**

The issue of validity and reliability of the study was addressed by employing an overarching approach founded upon thoroughness and completeness throughout the study. This is epitomised in several ways, namely by adopting a more robust and systematic approach, along with precautionary measures undertaken in the course of the study, some of which are explained in the subsequent paragraphs.

Firstly, the validity and reliability of the study is addressed by the mixed methods approach, by collecting different data from various methods namely survey questionnaires, interviews, walk-through observations and documents review as earlier mentioned in section 3.5.2. Such a multiple method approach complements instead of duplicates by capturing a more expansive and deeper expression of different aspects of the participants' experiences than a single method (Darbyshire *et al.*, 2005). It also enables the triangulation of the study findings, which to a certain extent contribute to the enhancement of reliability and validity in the study findings, thus offering avenues for generalisability (Iyer, 2008). As alluded to earlier in section 3.1.1, in cognizance of the limitations of single methods, the mixed methods design employed in the study allows for the combination of the cumulative strength of both quantitative and qualitative aspect of research (Gillham, 2005). This reinforces the research further (Greene and Caracelli, 1997) as the details of qualitative data like interviews can offer insights which are unattainable through typical quantitative surveys (Jick, 1979).

Secondly, as a measure to enhance the validity and reliability of the study, prior to the fieldwork, the survey questionnaires were pilot-tested with similar groups of participants as intended for the actual study as described earlier in section 3.5.2.1.2. Hence, this allows for the enhancement of instrument's reliability and

validity as vital aspects like content, question sequence, flow and naturalness of sections, duration, timing, and understanding of the question were checked and improved accordingly.

Thirdly, the sample size of the survey (Table 3-1) and interviews (Table 3-2) and representativeness of the sample participants from the selection method as explained in section 3.4.4 further contribute towards enhancing the validity as well generalisability of the research, not only in Malaysia, but perhaps other similar South East Asian countries and beyond.

Fourthly, in order to further increase the reliability of the interviews, the interview is semi-structured in nature, with the use of an interview protocol. These would allow for some form of relative consistency in terms of the way in which the questions are asked to the interviewees. In addition, all of the interviews were conducted by the sole researcher, providing further consistency in the interview data collection process.

Fifthly, in order to check the content of the interviews and increase the validity and reliability of the interview transcripts, the transcriptions were printed and follow-up sessions were organised on another day through arrangement with the school. Such sessions were organised to give opportunity for the participants to verify what was said during the interview. Where this was not possible due to the time and schedule constraints, an alternative email correspondence was utilised for the same purpose. All 70 interview participants checked and validated their transcripts.

Last but not least, the use of technological support in the form of two digital audio recorder and a high resolution digital camera (24 megapixel) were also utilised as a means of enhancing the validity and reliability of the research. This measure has enabled the capture of audio data records and contextualised visual data evidence of higher quality respectively, made possible by both digital equipment aforementioned.

The above explanations, although not exhaustive, offers an overview of the systematic approach of the study in terms of various ways in which the validity and reliability of the research was enhanced.

### **3.8.2 Ethics**

Another vital aspect of research that needs to be considered is the ethical element, which is defined as '*a code of conduct or expected societal norm of behaviour of researchers while conducting research*' (Awang, 2012, p. 10). This stems from an understanding that the bedrock of a good research is the constant observation of '*ethics of respect for the person, knowledge, democratic values, the quality of educational research and academic freedom*' (British Educational Research Association, 2011, p. 4). Hence, the ethical concerns should be positioned at the forefront of research and sustained throughout the research (Wellington, 2000).

The researcher fully understand and appreciate the ethical issues related to the study and subscribed to the above mentioned principle by adopting several steps. As it is perhaps difficult to discuss all ethical issues of the study, for the purpose of discussion in this sections, several primary ethical concerns are highlighted and explained below.

#### **3.8.2.1 Rules and regulations**

As aforesaid in section 3.5.1, the necessary approvals from various parties for conducting the fieldwork were also submitted and gained prior to the data collection.

First, a formal ethical review procedures was undertaken prior to the fieldwork, in accordance to a custom of research communities including universities (Gillham, 2005). To this end, submission to the Newcastle University Review Panel before conducting the data collection was made well in advance and subsequently granted (Appendix 9). This affords a valuable opportunity for the researcher to anticipate and contemplate in advance on the potential ethical issues that may surface and how best to address them. Hence, the researcher is able to make an informed decision from such awareness of several critical and sensitive issues that may emerge from the study prior to data collection (Kvale, 2007).

Besides that, the research protocol for conducting research in Malaysia was also adhered to by seeking approval from two government Malaysian authorities, namely the Prime Minister's Office and MOEM, which is the primary

gatekeeper to schools. This was submitted online together with necessary research documents to further safeguard all the parties concerned and ensure a smooth research fieldwork. Subsequently, approvals from these authorities were granted (Appendix 8).

Lastly, as explained in Figure 3-5, with the necessary approvals in hand, the researcher followed the proper protocol by informing each school and agency involved via written letters and emails prior to the fieldwork. This was followed by an initial visit to each venue to meet with the respective administrators to discuss the fieldwork arrangement before the actual data collection. All these was undertaken not only on the basis of ethical concerns but also as a sign of respect for the authorities and participants.

### *3.8.2.2 Informed consent*

Another vital ethical issue that needs to be addressed in research, which is equally dominant in the ethics literature (Braun and Clarke, 2006), is the informed consent (Howe and Moses, 1999). Essentially it is the voluntary consent of a person to take part in research (Burgess, 2005), which involves notifying the participant about the aims of the study, the fundamental design features, as well as potential risks and benefits in taking part (Kvale, 2007).

In this study, the process of gaining informed consent from the adults and school children were addressed accordingly. Due to the children's position of vulnerability, special permission was requested from their gatekeeper. An information sheet containing information about the objectives of the project, what the project will involve, how the participant is being asked to contribute and contact details of the researcher was distributed to all research participants including school staff and the pupils' parents or guardians who are going to participate in the research. In the case of the parents and guardians of pupils, this information was given via the school, prior to the research taking place. Considering the children's age, it is felt that their written consent would not be meaningful in all cases, but where pupils are interviewed, their oral consent was recorded. In the case of adult participants, similar information sheet was used and a consent form was used to obtain their written consent.

#### 3.8.2.3 *Protection from harm*

It is argued that all parties, including researchers, respondents and individuals involved in the study must be protected (Awang, 2012) and shall not be harmed (Burgess, 2005). Others emphasised that the research participants '*should never be exposed to situations where they could be subjected to physical or mental harm*' (Sekaran, 2005, p. 261). In order to address this ethical issue in the current study, the researcher interviewed all the participants in fairly secure venues, within schools or government offices, each of which has security measures with respect to access to the premises or buildings. In addition, the students were all within a group at all times during both the research phases within the normal school environment during their normal school day. Hence, in terms of the physical risks, it is no different from any other day at school. Considering stress and psychological risk to the participants, the researcher is confident that the normal school's safeguards and practices provided participants with the usual standard of safety.

#### 3.8.2.4 *Coercion*

Another ethical issue that was considered in this study is coercion. It has been argued that participation of respondents in the research should be voluntary and their responses should also be free from any influence (Awang, 2012). In order to address this concern, the researcher had taken the necessary steps by informing that participation is totally voluntary and that they may withdraw from the activity at any time. This was explicitly stated in the information sheets given to all participants and re-enforced further through briefing and debriefing session during the research.

#### 3.8.2.5 *Confidentiality*

Confidentiality is another critical ethical issue that needs to be addressed (Howe and Moses, 1999). This is commonly understood as akin to privacy (Oliver, 2003) and closely associated with issues of anonymity (Wiles *et al.*, 2004). It infers that private personal data which identifies the research participants would not be revealed (Kvale, 2007; Berg, 2009). In the case of the current study, assurance that all the information given will be treated as private and confidential was given by the researcher (Wellington, 2000), as explicitly stated in the information sheet and verbally re-enforced at every stage of the research. For the interview, what was relayed by the interviewees was treated '*with*



*sensitivity and care*' (Pring, 2000, p. 147) because such accounts are acquired under conditions of confidentiality.

#### 3.8.2.6 Data protection

Last but not least, the data protection issue was also addressed by the researcher. This was underlined by the Data Protection Act 1998 which places confidentiality and data protection issues as a serious matter and therefore it is vital for the researcher to be '*attuned to his obligations and what is required of him*' (Bryman, 2012, p. 137). This is translated by the researcher's action and practice by ensuring that the data gathered from the study was secured at all times. For instance, identifying information of the adult interview participants' was stored separately to interview data. Interview transcripts, audio files and photographs were numbered, coded and anonymised by use of pseudonyms, while identifying data was stored separately. Besides that, any electronic data was also stored on the secure password protected research data server at the University.

In sum, the above mentioned steps have been undertaken to ensure that ethical concerns are addressed. However, more often than not, in practice, the ethical issues needs to be deliberated and solved often in the research context (Burgess, 2005). A mechanistic approach to ethical issues is rather impractical, hence, a situational and reflexive approach is more practical (Atkins and Wallace, 2012). In such a case, an apt response in a thoughtful and reflective way, making certain that it is not only moral, but ultimately in the best interest of all parties involved (Atkins and Wallace, 2012).

### 3.9 Summary

This chapter has addressed the research approach, methodology and mixed methods design of the study. The rationale for adopting this approach was also explained. The population, sampling strategy and procedures were described and the data collection, data analysis and data integration rationalised. The ethical concerns as well as validity and reliability of the study were also addressed. The aspects that were described within this chapter however, does not intend to be exhaustive, due to the limitations of space. Instead, it offers a general overview of the way in which the research was approached and

undertaken to achieve its aims of studying the subject matter of school building maintenance. In the following chapter, the integration of the data collected through the methodology will be discussed in the findings.

## Chapter 4. Findings

In this chapter, the result of the current study is presented in the following order. Firstly the demographic of the survey is discussed. Secondly, the discussion of the findings of the study would be undertaken under four key themes, primarily outlined in the research objectives, namely the school building condition, the effects of school building maintenance and physical condition, the current maintenance practices and experiences, as well as its major challenges. In terms of presentation of data findings, in the interest of brevity and coherence of the main themes, the findings are presented with the weaving of both relevant quantitative and qualitative primary data collected throughout the length of this study as earlier alluded in section 3.7. To recap, the questionnaire findings would form the spine of the themes, and inputs from interviews as well as photographic evidence from school visual observation would follow. Where extra information is relevant and worthy of discussion, interviews or photographs data are also provided. It is hoped that such infusion of mixed data findings from these various sources would enable data triangulation, consequently, arriving at a more comprehensive and enriched description of the phenomenon under study, namely school building maintenance. Finally, the summary of the findings are produced at the end of this chapter, outlining the key emergent themes to be discussed further in the next chapter.

As alluded earlier in section 3.7, the quantitative and qualitative findings were synthesized through the narrative approach by weaving both findings thematically (Fetters *et al.*, 2013). With regards to fit, confirmation, expansion and discordance may appear, each with its own strengths and weaknesses. Where confirmation occur, the results credibility are enhanced (Fetters *et al.*, 2013). When expansion occurs, the divergence of data enabled expansion of insights of the issue. When discordance or silence appear – where a theme or finding emerges from one data set and not another, this could help to enhance understanding or provides direction for further research (O'Cathain and Thomas, 2004; Fetters *et al.*, 2013) Basically, the aim of mixing is not for sole purpose of corroboration but more importantly is to increase one's understanding (Onwuegbuzie and Leech, 2004 ).

## **4.1 Participants demographics**

For the first part of this chapter, the demographics of the survey conducted is presented to offer some general idea of the background of the respondents involved in the current study. It is worth noting that the planned selection basis of the respondents is to gain as much as variance as possible as explained in the previous methodology chapter. Such criteria were relayed to each school leaders during the school visit. Nonetheless, for the actual fieldwork, as expected, the selection of the respondents for the teachers and students are wholly dependent on the discretion of the school leaders and mostly based on factors like convenience and availability.

### **4.1.1 Survey demographics**

The following sub-sections describe the demographics of the survey undertaken in the current study, with more details available in Appendix 23:

#### **4.1.1.1 Gender**

Overall, the respondents of the research consist of around 60% female and 40% male as shown in Appendix 23A. Further examination of gender based on the respondent type revealed that females are the dominant majority in the principals (61%), teachers (64%) and students (60%) group, with the exception of the officers group whose majority (91%) are males. Such findings are perhaps satisfactory as it appears to be consistent with the general population trend of the country being studied.

#### **4.1.1.2 Age**

Overall, the adult respondents in the study managed to cut across the age of government employees from the age of 25 to 55+ as shown in Appendix 23B. In terms of officers, it is well represented ranging from relatively experienced officers of 40+ to very senior ones of 55+ years old and above. The breadth of experience of principals is also good, which spans from junior to highly experienced school leaders. Similar pattern of age representation was also evident in teachers, as it offers a good mix of new and senior teachers across the profession.

With regards to the students, the result of the analysis in Appendix 23B showed that the majority (84%) are 16+ years old as initially planned. Nevertheless, the selection by the school seems to be favourable in terms of gaining wider variance of other age groups as well. In sum, from the above analysis of the adult and student respondents, the aim of the research to cover as much variance of age distribution for all the categories is achieved.

#### *4.1.1.3 Ethnic group*

With regards to the ethnicity of the respondents, as shown in Appendix 23C, it illustrated that the huge majority (90%) are Bumiputera, followed by Indians at 5%, Chinese at 4% and others less than 1%. This reflects the education and civil servant profession trend which is dominated by Bumiputera. In terms of the students' ethnic composition, the choice of schools selected in terms of the type and location also could be an influential factor for such result.

#### *4.1.1.4 Qualification*

As illustrated in Appendix 23D, the majority of respondents (78%) are degree holders. The respondents who have Masters are at 20%, and this is trailed by the Diploma holders and lastly the minority PhD graduates at 0.5%. A more detailed analysis of the survey data also mirrored the initial trend, with the majority of degree graduates in all three categories of officers (46%), principals (61%) and teachers (81%). The trend is perhaps considered normal in the educational profession, and especially in secondary schools, primarily due to the MOEM's initiative to increase the level of qualification of teachers in the teaching profession.

#### *4.1.1.5 Years at current post*

In terms of the length of years at the current post, each respondent type is represented in the three groups, with a similar trend as demonstrated in Appendix 23E. The majority of both officers (55%) and principals (83%) are in the less than 6 years group. For the 6 to 10 years group, officers are 36% and principals are at 11%. Lastly, 9% of the officers and 6% of the principals are at the higher end of the spectrum. This bodes well for the study as this provides the study with a relatively broad spectrum of experience in terms of the officers and principals.

#### *4.1.1.6 Years of service*

From the overall years of service in the education profession as shown in Appendix 23F, the result is good for the study as it indicates the wide breadth of experience of the respondents, which ranges from the less than 6 years to the very senior staff with more than 26 years professional experience. Additional examination of the adult respondents according to respondent type disclosed that officers and teachers in the survey are represented in each service groups. Naturally, the principal respondents are at the further end of the spectrum, with service experience ranging from 21 years and above.

#### *4.1.1.7 Years at current agency/school*

For the officers, as illustrated in Appendix 23G, the years at the current agency ranges from less than 6 years to the 16 to 20 years cluster. The majority (37%) are in the 6 to 10 years group, while 27% is in the less than 6 years group, with the 11-15 (18%) and 16 to 20 years band (18%). This indicates a wide breadth of experience and familiarity of the officers involved with the topic of maintenance.

With regards to the years at current school for the teachers and principals, the former are distributed across the five distinct groups of years, while the latter are at the opposite end of the two extremes, namely less than 6 years (83%) and 21 to 25 years (17%). In terms of the positive gains from this data to the study, the teachers' wider distribution could perhaps offer a more comprehensive perception of the school building and its maintenance across the spectrum from the ones who are new to the school right up to those who have been in the school for a substantial period. In terms of the principals' data, it could perhaps offer their views based on their experience of managing the school building maintenance in a new or several schools. For the principals who have been in a school for a long period of time, they could offer their perspective of school building maintenance of that particular school more elaborately or extensively.

Meanwhile, the result of the data also showed that there is a wide range of years at current school for the student respondents. The majority (52%) have been in the same school for 4 to 5 years, followed by less than a year (28%) and 2 to 3 years (20%). Similarly like the teachers, this variance perhaps could

allow for a more comprehensive viewpoint of the students from those junior pupils who have been in the school for a short time to the ones who have been in the school longer.

#### ***4.1.2 Interviewees' profile***

Due to the limited availability of space, only a general description of the interviewee profiles as a group is presented in the following paragraphs, with a more detailed profile of each respondent made available in Appendix 7.

With regards to the five education officers, all are male Bumiputera, aged from the youngest at 40 years old to the oldest senior officers at 56 years old. Collectively, their breadth of experience levels range from planning and managing physical development projects of schools under their supervision to macro planning at the national level, which include school building maintenance among others. As a group, they are quite experienced officers as they have been in their respective agency ranging from 4 to 12 years.

Meanwhile, with respect to the school leaders, all nine are Bumiputera, with five males and four females. The youngest of them is 46 years old while the oldest is 58 years old. Experience wise, the most junior principals are only on the job for around six months in their first school while the senior ones have been principals for a significant part of their careers, around 10 to 15 years for some of them, in several schools.

The selected teachers group consists of seven males and one female, all of whom are Bumiputera. The most junior is a recent overseas graduate who was only been on the post for about a year, while some of the senior ones have been in the profession for more than two decades. In terms of years in their current school, this ranges from 1 to up to 23 years in the same school. With regards to their teaching subjects, this covers various disciplines like humanities, language, vocational and technical, science and mathematics.

An overall total of 48 students was selected for the semi-structured interview phase in this study. A feature common to all these selected eight groups of students is that each was individually nominated by their respective school. Prior to the study, the researcher requested that each group consisted of three

males and females so as to provide an equal gender representation in the number of students' participants for the session, although one did only have a single female participant. The majority of these students are predominantly Bumiputera, although Indian students are represented. All of the selected students are between 16 to 17 years old. In terms of the students' length at their school, it ranges from a minimum of 3 months to 3 ½ years depending on the individual student.

#### **4.1.3 Summary**

In summing up the survey demographics, the above analysis and discussion seem to achieve as much variance of the respondents' demographic aspects as originally outlined by the researcher. Meanwhile, the above mentioned interviewees' demographics similarly indicate an extensive mix of participants.

#### **4.2 School buildings condition**

The condition of the school buildings in the 18 schools in the research is evaluated by surveying the perception of the officers, principals, teachers and students. It must be said that the officers' perceptions were based on school buildings condition under their care in general. Meanwhile, principals, teachers and students made their decision based on their own respective school. Within this aspect of school building condition, the overall building condition is taken directly from the survey question to that effect. In terms of definition of the categories used in the survey with regards to the school building condition, they are as follows in Table 4-1:

<b>Excellent</b>	New or easily restorable to "like new" condition; only minimal routine maintenance required.
<b>Good</b>	Only routine maintenance or minor repair required.
<b>Adequate</b>	Some preventive maintenance and/or corrective repair required.
<b>Fair</b>	Fails to meet code and functional requirement in some cases; failures(s) are inconvenient; extensive corrective maintenance and repair required.
<b>Poor</b>	Consistent substandard performance; failure(s) are disruptive and costly; fails most code and functional requirement; requires constant attention, renovation, or replacement. Major corrective repair or overhaul required.
<b>Extremely poor</b>	Non-operational or significantly substandard performance. Replacement required.

*Table 4-1: Details of Likert scale rating of school condition*



### 4.2.1 Overall condition of school

The study result of the overall condition of the school building is discussed below with sub-sections at individual school, school type, school location, school age and respondent type to offer a multitude of different angles of possible interests.

#### 4.2.1.1 Overall building condition and individual school

The survey result in Table 4-2 showed that the majority of respondents in each school rated the overall condition of their respective school between 'Adequate' and 'Good' condition in terms of its maintenance. What this suggests is that all the schools only require routine maintenance or minor repairs (Adequate) or some preventive maintenance and/or corrective repair (Good).

Sch. type	School code	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
National Secondary	S04	0	-	4	10.0	10	25.0	15	37.5	10	25.0	1	2.5
	S09	0	-	0	-	10	29.4	15	44.1	9	26.5	0	-
	S10	0	-	0	-	3	7.1	15	35.7	15	35.7	9	21.4
	S15	0	-	2	5.6	8	22.2	20	55.6	5	13.9	1	2.8
	S17	1	2.5	6	15.0	10	25.0	17	42.5	6	15.0	0	-
Fully Residential	S03	0	-	0	-	3	7.1	16	38.1	17	40.5	6	14.3
	S06	0	-	0	-	0	-	5	12.8	26	66.7	8	20.5
	S08	1	2.6	2	5.1	11	28.2	16	41.0	9	23.1	0	-
	S11	0	-	1	2.4	5	11.9	18	42.9	16	38.1	2	4.8
	S18	0	-	0	-	1	2.4	12	28.6	25	59.5	4	9.5
Technical/ Vocational	S01	0	-	0	-	0	-	14	35.0	22	55.0	4	10.0
	S02	0	-	5	11.6	3	7.0	19	44.2	14	32.6	2	4.7
	S12	4	10.3	2	5.1	7	17.9	16	41.0	10	25.6	0	-
	S13	0	-	0	-	3	7.5	15	37.5	20	50.0	2	5.0
	S16	0	-	0	-	2	5.0	9	22.5	20	50.0	9	22.5
Religious	S05	0	-	2	5.3	6	15.8	20	52.6	10	26.3	0	-
	S07	0	-	0	-	3	7.1	12	28.6	26	61.9	1	2.4
	S14	0	-	0	-	11	25.0	26	59.1	7	15.9	0	-

Table 4-2: Overall condition aspect (Individual school)

Nevertheless, from these 18 schools, there are three schools that had the category of 'Extremely poor' chosen by some of their respective respondents as

indicated in Table 4-3. Upon examining the available data, including field notes and photographs taken during the school visit, the following rationales could perhaps assist to explain some underlying reasons for such a choice in each case.

School type	School code	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
National	S17	1	2.5	6	15.0	10	25.0	17	42.5	6	15.0	0	-
Residential	S08	1	2.6	2	5.1	11	28.2	16	41.0	9	23.1	0	-
Technical/Vocational	S12	4	10.3	2	5.1	7	17.9	16	41.0	10	25.6	0	-

*Table 4-3: Overall condition aspect (Selective)*

In the case of school S17, there is one whole new three storey block which was completely closed for use during the researcher's visit. The building is located at the lowest end of the school compound right next to the school field. The researcher was informed that there is a contentious issue with regards to the school field ownership, which was once deemed a public field. Although the school field and the surrounding area of the block were fenced up, there were some incidences where these fences and gate were damaged by trespassers as shown in Photo 4-1 and Photo 4-2 below. Due to this safety reason, the whole school block was closed off. The fence is in the process of being repaired and there is already a plan to use the building soon. This is perhaps among the reasons for the 'Extremely poor' category selection by some respondents in the school.



*Photo 4-1: S17 school field facing the closed block (left) and damaged fences in between (right)*



*Photo 4-2: Outer fence around the S17 school field (left) and damaged access gate (right)*

In the case of school S08, the researcher deduced that one possible reason for the ‘Extremely poor’ rating is the subsidence issue which was a constant major challenge faced by the school. Photo 4-3 taken during the school walk-through exemplifies the issue of maintenance the school had to deal with caused by the subsidence, which would be discussed further in section 4.6.1.



*Photo 4-3: Cracks on building apron (S08)*

In the case of school S12, no major school building faults or defects were evident from the walk-through observation. Hence, the ‘Extremely poor’ category chosen by a small minority of the students mystifies the researcher. Nevertheless, the open-ended answers in the questionnaire offered some possible explanation for such choice. It appears that a few students (S12C13; S12C12; S12C17) were disappointed with the current school facilities provided, citing them as not up to the standard appropriate to its new status as a college.

#### 4.2.1.2 Overall building condition and types of school

Examining the overall condition according to the school type, similarly the majority of respondents graded their respective schools between 'Adequate' and 'Good' category as Table 4-4 demonstrates. Specifically, the majority of respondents of national schools (42.7%) and religious schools (46.8%) felt that their schools are 'Adequate', requiring some preventive maintenance and or corrective repair. Meanwhile, the majority respondents from both residential (45.6%) and technical/vocational schools (42.6%) graded their schools as slightly better off at 'Good', indicating their schools only require routine maintenance or minor repairs. The possible reason for this minor difference could perhaps be attributed to two extra aspects which are not available to the national and religious schools: a) the availability of school technical personnel; and b) special division as care taker for school physical development and maintenance needs.

School type	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
National	1	0.5	12	6.3	41	21.4	82	42.7	45	23.4	11	5.7
Residential	1	0.5	3	1.5	20	9.8	67	32.8	93	45.6	20	9.8
Tech/ Voc.	4	2.0	7	3.5	15	7.4	73	36.1	86	42.6	17	8.4
Religious	0	-	2	1.6	20	16.1	58	46.8	43	34.7	1	0.8

Table 4-4: Overall condition (School Type)

#### 4.2.1.3 Overall building condition and school location

As shown in Table 4-5, with regards to overall building condition and location of the schools, there is a similar result as the majority of the respondents of both 'Rural' (38.8%) and 'Urban' (38.8%) schools felt that their school building are under the 'Adequate' category. This essentially means that in general their school buildings need just some preventive maintenance and/or corrective repair.

School location	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Rural	1	0.3	11	3.1	47	13.2	138	38.8	133	37.4	26	7.3
Urban	5	1.4	13	3.6	49	13.4	142	38.8	134	36.6	23	6.3

Table 4-5: Overall condition (School location)

#### 4.2.1.4 Overall building condition and school age

As shown from the individual school in Table 4-6 and Table 4-7, with reference to the overall building condition and building age, the majority of its occupants felt that their respective schools are within the 'Good' and 'Adequate' categories. Through the examination of the result of the survey shown above, it seems that there is no major difference in terms of the overall condition of the school buildings and the school age individually (Table 4-6) or collectively (Table 4-7).

School age		Year built	Sch. code	Extreme Poor		Poor		Fair		Adequate		Good		Excellent	
				No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 15 years	11	2004	S16	0	-	0	-	2	5.0	9	22.5	20	50.0	9	22.5
	12	2003	S11	0	-	1	2.4	5	11.9	18	42.9	16	38.1	2	4.8
	13	2002	S08	1	2.6	2	5.1	11	28.2	16	41.0	9	23.1	0	-
	14	2001	S09	0	-	0	-	10	29.4	15	44.1	9	26.5	0	-
	15	2000	S18	0	-	0	-	1	2.4	12	28.6	25	59.5	4	9.5
16 – 30 years	16	1999	S12	4	10.3	2	5.1	7	17.9	16	41.0	10	25.6	0	-
	19	1996	S06	0	-	0	-	0	-	5	12.8	26	66.7	8	20.5
	21	1994	S05	0	-	2	5.3	6	15.8	20	52.6	10	26.3	0	-
	22	1993	S01	0	-	0	-	0	-	14	35.0	22	55.0	4	10.0
	25	1990	S13	0	-	0	-	3	7.5	15	37.5	20	50.0	2	5.0
31 – 45 years	31	1984	S14	0	-	0	-	11	25.0	26	59.1	7	15.9	0	-
	32	1983	S07	0	-	0	-	3	7.1	12	28.6	26	61.9	1	2.4
	37	1978	S02	0	-	5	11.6	3	7.0	19	44.2	14	32.6	2	4.7
	42	1973	S03	0	-	0	-	3	7.1	16	38.1	17	40.5	6	14.3
46+ years	47	1968	S15	0	-	2	5.6	8	22.2	20	55.6	5	13.9	1	2.8
	57	1958	S04	0	-	4	10.0	10	25.0	15	37.5	10	25.0	1	2.5
	61	1954	S10	0	-	0	-	3	7.1	15	35.7	15	35.7	9	21.4
	63	1952	S17	1	2.5	6	15.0	10	25.0	17	42.5	6	15.0	0	-

Table 4-6: Overall condition aspect (Individual and School age)

School Age	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
0 - 15 years	1	0.5	3	1.5	29	14.7	70	35.5	79	40.1	15	7.6
16 - 30 years	4	2.0	4	2.0	16	8.2	70	35.7	88	44.9	14	7.1
31 - 45 years	0	-	5	2.9	20	11.7	73	42.7	64	37.4	9	5.3
46 years and above	1	0.6	12	7.6	31	19.6	67	42.4	36	22.8	11	7.0

Table 4-7: Overall condition aspect (School age)

Nonetheless, there is a need for caution in the interpretation of the survey result related to the age factor, primarily due to the difficulty in determining the actual age of some of the school above. This is because there is a mixture of old and new blocks of school buildings in one school compound. As student Brian (S03) stated *'this school has a mix of new buildings and also some dilapidated [old] buildings'*. Thus, this combination makes determining the exact school building age very difficult. Such assortment of old and new school buildings were also observed during the school visit as exemplified by the following photos.

Nonetheless, contrary to what was described by **Brian** in his school (S03), Photo 4-4 and Photo 4-5 taken in a different school (S10) demonstrated that old school buildings do not always necessarily mean they are dilapidated if they are properly maintained and cared for.



*Photo 4-4: Mixture of old buildings used as teachers office (left) and school co-operative shop in front of new school buildings in the background in S10 (right)*



*Photo 4-5: Another old school building built in 1952 (S10)*

In this particular school (S10), the old school buildings were well-maintained and mostly still operational as shown in Photo 4-4 and Photo 4-5. Conversation with the senior assistant revealed that these buildings are considered unique historical assets and are a source of pride for the school and its community. In

fact, this national secondary school's future plan was to convert the currently unused old circular building (Photo 4-5) into an official school gallery to display its extensive collection of past achievements.

However, some like officer Kenny (A2) felt that *'the age factor of the school building would obviously have an impact too, especially those schools of more than 50 years old, as they are older buildings, then there are more defects'*. Experiences of old broken, leaking and rusty plumbing issues from the 80s relayed by teacher Benjamin (S03) further gives credence to Kenny's argument.

Further examination of all 18 school profiles data via perusal of school records (Appendix 4) provided additional support to such old and new mix, suggesting that this feature is typically found in most schools regardless of types, as exemplified by the school building profile of one fully residential school (S03) in Table 4-8.

Building	Use/Purpose	Year built
Block A	Administration & teaching and learning	1999
Block B	Teaching and learning	1999
Block C	Administration & teaching and learning	1999
Block D	Teaching and learning	1980
Block E	Teaching and learning	1973
Block F	Teaching and learning	1973

*Table 4-8: Example of one school building profile (S03)*

Based on the researcher's work experience, as most schools developed throughout the years, additional school buildings are constructed progressively: a) to cater to the increased demand for school places due to the annual growth of students' enrolment; b) to replace old buildings unfit for use; and c) to accommodate changes in the national education policy and curriculum.

#### *4.2.1.5 Overall building condition and respondent type*

Upon examination of the survey from the multiple perspectives of the different respondent groups, the result pointed out to the following result with regards to the overall condition of their respective schools as shown in Table 4-9:



Respondent	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	0	-	5	45.5	5	45.5	1	9.0
Principals	0	-	2	11.1	2	11.1	5	27.8	9	50.0	0	-
Teachers	1	0.6	4	2.2	17	9.4	78	43.3	74	41.1	6	3.3
Students	5	1.0	18	3.4	77	14.7	197	37.6	184	35.1	43	8.2

*Table 4-9: Overall condition aspect (Respondent type)*

It showed that similarly, the majority of the each group of respondents agree that the overall school building condition is within ‘Adequate’ to ‘Excellent’ categories. One principal’s expression of satisfaction with the condition of his school buildings perhaps encapsulates the feeling of the majority of respondents. Principal Cameron (S06) said that at the moment, he is very satisfied with his school building condition because *‘it has been given due attention with maintenance, [and] it has always been supervised’*.

#### **4.2.2 Urgent maintenance issues in own school**

It is however worth noting that every individual school is different. Hence, in some cases, their school building maintenance needs and issues are also different and unique, as principal Felicia (S10) eloquently alluded to while recounting her previous experience working at the DEO level. Perusal of school maintenance documents during the school visits seems to confirm such opinion as summarized in Appendix 21.

Despite this variation, perhaps it would be interesting to explore the possibility of any commonality of maintenance issue between them which could be worthy of consideration. To this end, the survey responses of the critical maintenance issues in their respective schools were further examined using SPSS, whereby the median of ranking given by each respondent group was analysed and categorised into three major levels of urgency: most urgent; moderate; and least urgent.

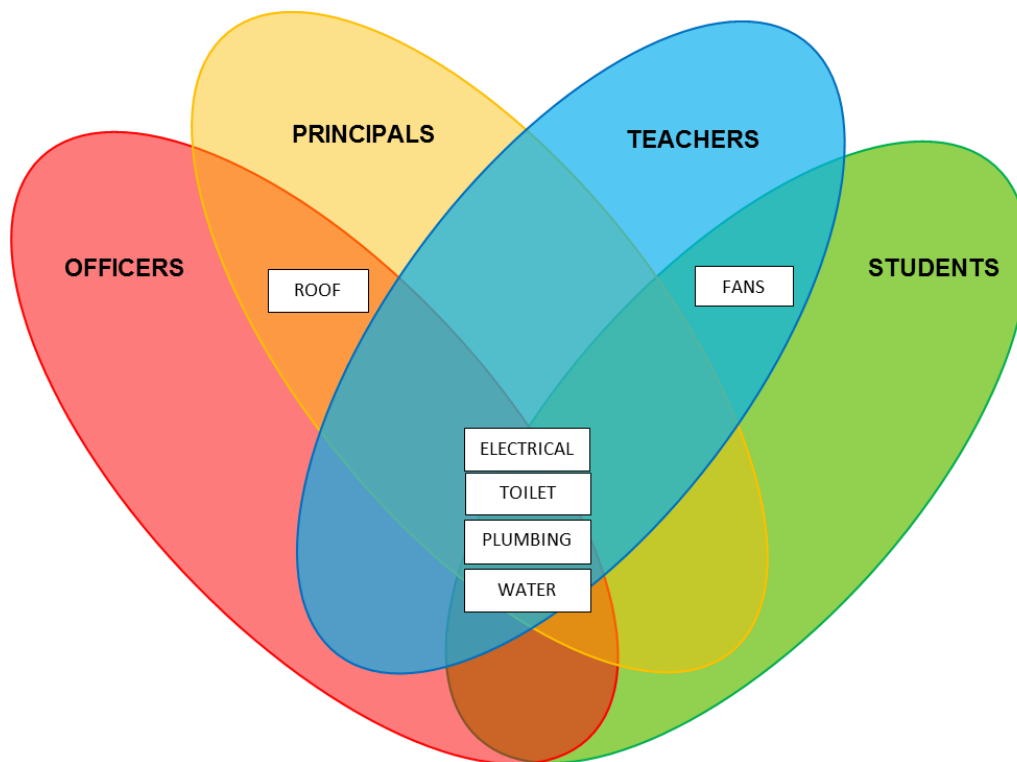


The result shown in Table 4-10 suggested that the rank order of urgent maintenance issues in respective schools varies between different groups. In spite of these differences of order, interestingly enough, there are notable commonalities shared between these four groups of respondents.

Category	Rank	Officers	Principals	Teachers	Students
Most urgent	1	Electrical system	Electrical system	Electrical system	Toilet
	2	Roof	Plumbing	Toilet	Water supply
	3	Toilet	Toilet	Ventilation/Fan	Plumbing
	4	Water supply	Roof	Water supply	Ventilation/Fan
	5	Plumbing	Water supply	Plumbing	Electrical system
Moderate	6	Sewerage	Ventilation/Fan	Door	Sewerage
	7	Pest Control	Door	Lighting	Lighting
	8	Ceiling	Sewerage	Roof	Drainage
	9	Door	Ceiling	Sewerage	Window
	10	Window	Floor	Ceiling	Door
	11	Foundation	Drainage	Floor	Floor
	12	Floor	Window	Window	Ceiling
Least urgent	13	Ventilation/Fan	Lighting	Drainage	Exterior wall
	14	Lighting	Pest Control	Foundation	Foundation
	15	Drainage	Exterior wall	Interior wall	Roof
	16	Exterior wall	Foundation	Exterior wall	Interior wall
	17	Interior wall	Interior wall	Pest Control	Pest Control

*Table 4-10: Ranking of urgent maintenance issue in own school*

However, in the interest of brevity and focus, only the top five items of most urgent aspects of maintenance were selected for discussion. To this end, the top five urgent maintenance issues in schools stated above by the different groups in Table 4-10 were converted into a Venn diagram (Figure 4-1) so as to offer a better visual representation for the basis of the preceding discussion.



*Figure 4-1: Urgent maintenance issues in the schools*

On the whole, from the total of 17 aspects of building maintenance, the six aspects which are deemed as the five most urgent issues are namely electrical system, toilet, plumbing, water, roof and fans. The Venn diagram (Figure 4-1) also showed that there are four mutual aspects considered as among the top urgent school maintenance issues by all distinctive group of respondents, namely the electrical system, toilet, plumbing and water. The administrators (officers and principals) shared one common aspect namely roof, while both the end users (teachers and students) mutually agreed on fans. Nevertheless, to gain an enhanced understanding of the above mentioned common urgent maintenance issues in schools, the qualitative data gathered in the study is valuable in offering further clarification on each issue.

#### *4.2.2.1 Electrical system*

As demonstrated in Figure 4-1, the electrical system is one of the maintenance issues which every group of respondents highlighted as urgently needing to be addressed in their respective schools. For the adult respondents, namely the officers, principal and teachers as shown in Table 4-10, they chose this aspect as critical due its impact on safety of the whole school community, particularly

the children. Officer Larry (A3) emphasised the need for electrical system maintenance in the form of rewiring as it is *'closely associated with safety'*. Teacher Callahan (S06) also relayed similar concern with this particular aspect arguing that *'most fire cases that happened are caused by short circuit and old electrical wiring'*. Principal Benedict (S03) shared the same sentiment, emphasising the need to maintain the school electrical system stating that *'electricity must be fixed first, if not the school could burn down'*.

Their genuine concern for such a possibility is brought to the fore by the experience of one such unfortunate school in the following Photo 4-6. According to one teacher of school S04, the fire occurred at the top floor of an old science laboratory block and fortunately happened during the school holiday and no one was hurt. The Fire Department's investigation suggest the likely cause was short-circuit.



*Photo 4-6: One closed off block where fire occurred (S04)*

Although such an incident is relatively rare in school building nationwide, as pointed out by officer Larry (A3), it nonetheless demonstrated the real possibility of such an episode. As such, this possible scenario underlines the need for maintenance, particularly in relation to schools' electrical system to prevent unexpected blackouts and more importantly dangerous short circuits.

Among the urgent maintenance issues related to the school electrical system cited by interviewees are the need to undertake comprehensive rewiring, switch and power sockets replacement, upgrading of main switch power distribution box, up-grading the whole school electrical system from one phase to three phase and recalibration of the electrical system. Nevertheless, some of these

maintenance works shown in Photo 4-7 have been undertaken in most of the schools visited.



*Photo 4-7: Old electrical main switch power distribution box (left) and its new replacement in S08 (right)*

The fire incident also pointed out the necessity of another vital maintenance aspect, which although not included in the study, remains significant nonetheless, namely the fire prevention and extinguisher system. This includes the typical fire extinguishers and also the electronic fire prevention system as shown in Photo 4-8. Officer Larry (A3) explained that since the systems are rarely used, ‘it will jam’ and ‘could not run’. Hence, some schools typically communicate with the Fire Department to assess the workability of the fire prevention system if the need arise, as evidenced by documents reviewed.



*Photo 4-8: Fire extinguisher in S03 (left) and fire prevention system in S16 (right)*

Subsequent interviews with officers Mark (A4) and Neil (A5) revealed that both aspects of electrical maintenance and fire prevention system are critical issues in the schools under their care. In fact, officer Neil (A5), emphasised the vital

importance of having both systems maintained, especially considering the fire risk, which is deemed higher in technical and vocational schools with the higher amount of electrical equipment and machinery in use at any one time in the numerous workshops. Nonetheless, written records suggest that maintenance needs of both systems were among the aspects which were requested from all schools by MOEM via SED in 2011 for project submission in the 10<sup>th</sup> Malaysia Plan.

#### 4.2.2.2 Toilet

The school toilet is another aspect which is deemed as a urgent maintenance issue. Among the typical problems associated with the toilets mentioned in the open ended survey section and interviews were broken toilets, damaged taps and broken flush systems. In some isolated cases, the toilets were closed for maintenance works as shown in Photo 4-9.



*Photo 4-9: Closed toilets awaiting maintenance works (S07)*

Benjamin, a S03 teacher cum senior assistant, described toilets as *'the biggest issue'* in both his school and hostels. Officer Larry's (A3) also concurred by identifying toilets as his *'first choice'* based on his survey and experience. Both of them agreed that the reason for criticality is due to toilets being the most frequented common facilities and its high number of student users in schools. As such, according to Larry, the toilets *'need to be made constantly ready to be used for daily activities'*. Benjamin agreed, citing it as one prime reason for his principal allocating huge budget to *'maintain all the toilets in the school and the hostels'*.

#### 4.2.2.3 Plumbing

As noted in Figure 4-1, another urgent maintenance issue mentioned in school is plumbing. Such an example was captured as shown in Photo 4-10 during one school visit (S12) which involved the underground water piping. As teacher Benjamin (S03) was keen to suggest, the plumbing issue could possibly be attributed to the age of the pipes, especially in an old school like his. In his case, *‘the pipe breaks here and there’*, causing water to seep into the thick walls. From his experience, *‘to fix it is even worse than if we built new, [so] might as well build a new one with the cost’*, thus indicating the difficulty and high cost involved in making the necessary repair.



*Photo 4-10: Leaking water pipes/plumbing (S12)*

#### 4.2.2.4 Water supply

Another urgent maintenance issue aforementioned was water. From the researcher's observation and interviews, the water issue is also a significant problem to certain schools. The issue was the disruption of water supply which at times *‘causes water to smell’*, voiced out by one male (S09T06) and one female (S09T09) teacher in their open ended survey section of school S09.

While some water supply issues are community problems for the surrounding area including the school like S09, some are linked with maintenance, like broken water pump, leaking main water tank (Photo 4-11) or leaking plumbing as aforementioned. These inevitably cause low water pressure and disrupt the supply system to the whole schools.





*Photo 4-11: School main water tank (S08)*

In order to address the shortage or disruption of the water supply to the school, one strategy employed by some school is to place big water containers in the toilets, similar to the ones witnessed in one particular school (S09) and shown in Photo 4-12. In addition, temporary water containers were also provided by the water companies at the school's request, as relayed by Elizabeth, the S09 principal.



*Photo 4-12: Water containers in toilet (S09)*

#### *4.2.2.5 Roof*

Roof is another urgent maintenance issue in most schools as indicated by the administrators in Figure 4-1. Interview data indicated that the most common issue is blown off roofs caused by storms or strong winds, typically in coastal areas. In such cases, it is considered an emergency by the MOEM or SED and the follow up action is immediate, as pointed out by principal Harrison (S16). Other common roof issues are leaking or damaged roofs as shown in Photo 4-13. Officer Larry (A3) attributed this issue to the local Malaysian weather with its frequent rain and hot sun as its primary cause. Nevertheless, From the

observations in the schools visited, the roof condition is generally satisfactory due to roof replacement work being progressively performed in schools like S09 (Photo 4-14). In some cases, work was undertaken to replace asbestos roofs in old school buildings (Photo 4-15).



*Photo 4-13: Example of roof issues in S02 (left) and S14 (right)*



*Photo 4-14: Some old original roof (left) and new roof in school S09 (right)*



*Photo 4-15: Old asbestos roof (left) and new roof installed in school S03 (right)*



#### **4.2.2.6 Fans**

Fans are a critical component in the school building, especially with the hot and humid condition prevalent in all schools throughout the country. As the use of fans are high especially during the afternoon sessions, they are likely to be in need of regular maintenance. Among typical issues raised were broken or noisy fans. It is worth noting that it is not only a critical issue in classroom (Photo 4-16) but also in school hostel (Photo 4-17).



*Photo 4-16: Ceiling fan in a classroom (S06)*



*Photo 4-17: Ceiling fan and wall fan in school hostel (S11)*

#### **4.2.3 Important maintenance aspects in school in general**

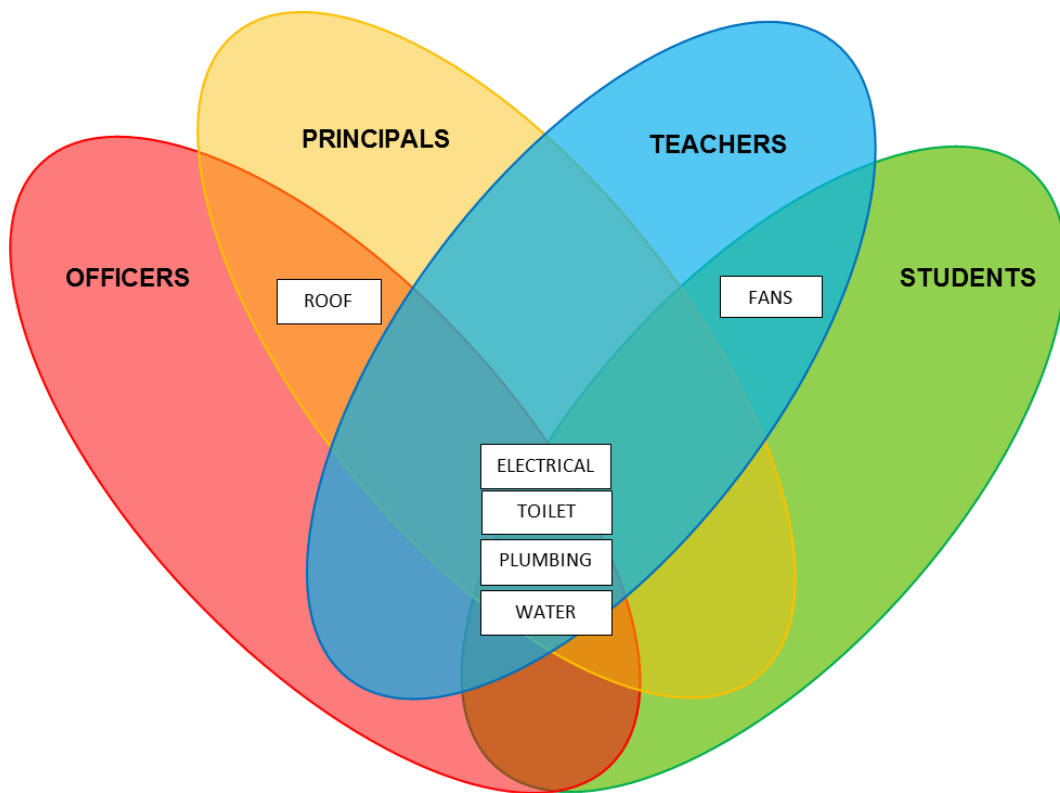
Apart from looking at the urgent maintenance issues in their respective schools in section 4.2.2, the survey also examined a general perception of what school building maintenance aspects are considered as important in general. For this purpose, the survey responses of the rank importance of maintenance aspects in general from these different respondent groups were further scrutinized. Using SPSS, the median of ranking given by each group of respondent were analysed and divided into three major categories, resulting in the ranking of important maintenance aspects in schools in general from each group as presented in Table 4-11.

Category	Rank	Officers	Principals	Teachers	Students
Most important	1	Electrical system	Electrical system	Electrical system	Toilet
	2	Toilet	Toilet	Toilet	Water supply
	3	Water supply	Roof	Water supply	Ventilation/Fan
	4	Plumbing	Plumbing	Plumbing	Plumbing
	5	Roof	Water supply	Ventilation/Fan	Electrical system
Moderate	6	Sewerage	Sewerage	Lighting	Lighting
	7	Pest Control	Foundation	Foundation	Drainage
	8	Foundation	Drainage	Roof	Sewerage
	9	Lighting	Door	Sewerage	Roof
	10	Drainage	Ceiling	Ceiling	Foundation
	11	Ventilation/Fan	Ventilation/Fan	Floor	Interior wall
	12	Door	Lighting	Drainage	Floor
Least important	13	Window	Floor	Window	Ceiling
	14	Ceiling	Window	Door	Window
	15	Floor	Pest Control	Exterior wall	Exterior wall
	16	Exterior wall	Interior wall	Interior wall	Door
	17	Interior wall	Exterior wall	Pest Control	Pest Control

*Table 4-11: Ranking of important maintenance aspects in a school*

The analysis result as shown in Table 4-11 exhibited only slight difference in term of order of importance in comparison with previous Table 4-10, but pointed to some similarities between the different groups of respondents. In this case, the priorities of the adults (officers, principals and teachers) are perhaps distinctive, namely, safety above anything else. Only then comfort comes into play, by attending to the basic rudimentary needs of the school community, namely water, toilets and plumbing, all of which are mutually dependent aspects. This is somewhat in contrast to what the students considered most important in general - toilet - signalling the physiological need above the rest.

The same display method via the Venn diagram was subsequently selected to better illustrate and discuss the aforementioned differences and similarities between the groups for the top five most important maintenance aspects as shown in Figure 4-2.



*Figure 4-2: Most important maintenance aspect in school in general*

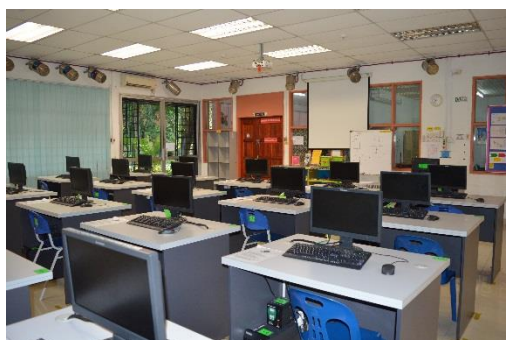
From the total list of 17 building maintenance aspects, similar result like earlier was achieved, whereby the same six aspects, namely electrical system, toilet, plumbing, water, roof, and fans, are also regarded as the most important aspect in school in general. As one male teacher (S18T03) stated in his open ended answer of the survey, *'important aspects like electricity, lighting, fan and water supply should be prioritised'*.

Similarly, the Venn diagram in Figure 4-2 also indicated that the four common top critical maintenance issue chosen by all respondent groups are the electrical system, toilet, plumbing and water. Again, similar to the Figure 4-1, the administrators (officers and principals) shared one mutual aspect namely roof, while both the end users (teachers and students) jointly decided on fans. So as to appreciate a better understanding of the underlying rationales for their choice of five top ranked important maintenance aspects in schools mentioned above, the combination of data from both the open-ended survey section and interviews, including the diamond ranking activity and walk-through observation provided further valuable points for clarifications.

#### 4.2.3.1 Electrical system: Rationales for importance

Essentially, the importance of electrical system is paramount as it provides electricity to support electrical equipment to the school for comfort and learning. Student Hank (S16) chose electricity as among the top maintenance aspects as the electrical system vis a vis electricity *'facilitates better learning'*, in that *'without electricity, it would be uncomfortable to study, as it is going to be hot and dark'*. Hank's view is supported by officer Neil (A5), who emphasised the importance of electrical system maintenance, especially wiring, as it would negatively affect the mechanical ventilation namely the fans, resulting in an uncondusive teaching and learning environment.

With the current policy of integrating the ICT tools in teaching and learning in schools nationwide as shown in Photo 4-18, the importance of electrical system plays is inevitable as alluded to by the respondents. Officer Neil mentioned the importance of the electrical system in enabling the students to use the necessary tool or equipment, like ICT, for their learning process like Photo 4-18.



*Photo 4-18: Air-conditioned computer laboratory (S01)*

His opinion is echoed by student Dylan (S07) who argued about the integral use of internet via various technological gadgets in the current learning environment. He contended that *'if the wiring is bad, the gadget would become useless'*, causing *'things that needs to be explained could not be understood by the students'* and *'the learning process is therefore inhibited'*.

Teacher Abraham (S01) gave his views on the matter in relation to dispensing his duties as a teacher. He reasoned that any damage to the wiring system *'would disrupt the teachers to carry out their teaching and learning process because they are unable to use the OHP or LCD projectors'*. In this case, his

teaching tool would be rendered useless and this could inevitably disrupt his lesson plan.

Another teacher, Georgina (S14), further argued that there is a need to match the implementation of a policy and situation on the ground particularly facilities that directly supports it, citing the ICT policy as an example:

*We need to use ICT more in school, therefore if there is no electricity, this means that the infrastructure does not support the policy. So it is going to be difficult. Thus, there should be harmonisation from that aspect.*

Meanwhile, officer Neil (A5) also emphasised further the importance of a well-maintained electrical system, which in his view is even more critical in the context of teaching and learning in the technical/vocational schools. This is primarily due to the daily need to use various specialised tools, machinery and equipment which are mostly operated using electricity in the workshops, as shown in Photo 4-19.



*Photo 4-19: Mechanical equipment in S01 (left) and electrical equipment in school workshop in S02 (right)*

Perhaps the importance of a well-maintained electrical system and electricity supply become even more apparent, especially for those schools with hostels like Photo 4-20, where students live and study during the school term.



Photo 4-20: Students' hostel building (left) and dorm room in S12 (right)

Student Brooke (S01) who is a hostel occupant argued her case in terms of providing the necessary power for night lighting which is *'important especially during prep [preparatory] session in the classroom'*. Perhaps Brooke's case is typical of many other hostel occupants, which exemplifies the need for a well-maintained electrical system including lighting. Another school hostel occupant Brad (S03) shared his opinion on the matter.

*The effects of school building maintenance is in hostel for example, we usually do our work at the lobby area. When the lighting and fans were not functioning, we were unable to study and do our work there. We can't do it in our room since the others are sleeping, so the lights cannot be switched on, so it affects our motivation to study and comfort too.*

In addition, the need for a well-maintained electrical system also could be justified in terms of the daily school operation. As argued by principal Gabriella (S14), *'without electricity, the clerks cannot do anything'*. This is understandable as most office tasks in Malaysian schools nowadays are done through the use of technology, especially with computers.

In sum, the importance of a well-maintained electrical system spans the whole school compound, and is not limited to classroom, but also in some cases hostels and even school offices. Inevitably, this would ensure that every student, teacher, principal, and support staff are able to go about his or her daily tasks and routine respectively in the schools without interruption.



#### 4.2.3.2 Toilet: Rationales for importance

It is apparent that toilets are one of the basic facilities that is needed and important anywhere including in schools. As shown in Table 4-11, from the student's perspective, toilet is deemed most important facilities because it is 'a *basic necessity for all students*', as suggested by student Hank (S16).

Another student is keen to state her case on the basis of physiology, associating it with health and comfort as her strong arguments. For student Daphne (S07), *'toilet is a facility needed by everyone'* because *'we are human beings which have a digestive system, so we need the toilets to prevent from jeopardising our health and also for students' comfort'*.

Elizabeth, one senior principal in school (S09), gave her perspective as school administrator on the toilet issue based on her vast experience in several schools.

*If we do not repair and maintain them [toilets], if they are clogged, the effect is to the students and teachers, basically to everyone. The students would frequently want to go out and go back home if their house are nearby. That leads to them asking for permission to go home. So many things. Anything can happen. There would be havoc in school.*

For Elizabeth, she can stand it *'if there is something else broken or damaged'*, but *'if toilet is broken, the implication is massive to the daily activity'*. Such importance placed on maintaining toilets is reiterated further by officer Larry (A3), who, based on his experience and survey with the students, indicated that *'the toilets are the most frequently used, and hence 'they need to be made constantly ready to be used for daily life activities'*.

#### 4.2.3.3 Plumbing: Rationales for importance

Plumbing is another element which has been chosen by the respondents as one of the vital aspects of school building maintenance. Its importance is the link between plumbing or piping to the school water supply system. This was acknowledged by officer James (A1) who viewed plumbing as essential to ensure that toilet and clean water supply could properly function. Any damage to this valuable connection within the school compound could most certainly

disrupt the essential water supply needed for normal daily use by the whole school community, like for washing their hands in the canteen (Photo 4-21) or even clothes for the hostel occupants (Photo 4-22).



*Photo 4-21: Sinks in canteen (S03)*



*Photo 4-22: Hostel occupants washing lines (S11)*

#### *4.2.3.4 Water supply: Rationales for importance*

In terms of importance of water, student Diana (S17), associated it with the use of toilet. According to her, if one need to use the toilet and there is no water, *‘it makes it difficult to do our ‘business [poo and pee]’*. As a result, *‘we cannot focus’* and *‘sometimes it could lead to illness or absence from school’*, consequently *‘this disrupts the education of the child herself’*.

Principal Gabriella (S14), meanwhile argued that without water, *‘people cannot come to school’*. The school will be *‘chaotic’* and *‘parents would be angry’*. The importance of water in the process of teaching and learning was also pointed out by officer James (A1), who claimed that it could have an effect on the teachers in terms of *‘carrying out the teaching and learning in schools’*.

James’s concern is valid and shared by principal Elizabeth (S09) who experienced first-hand how important water is in the said context. Once in her school, the Home Economics teacher was so stressed out as water could not



reach the Home Economics room on the third floor. She said she understood the situation, when the teacher asked her *'how can we do their practical session?.'* She was well aware that *'if [the room] is not cleaned properly, mice or ants would start to come'*, which could cause a health and safety issue. Elizabeth's above argument quite clearly demonstrated the huge importance of water in the Home Economics teaching and learning process which involve food preparation and cooking lessons. Similarly, any water supply disruption could also adversely affect other subjects too like Science in the laboratory (Photo 4-23).



*Photo 4-23: Science laboratory (S04)*

#### *4.2.3.5 Roof: Rationales for importance*

It is interesting to note that there are similarities of concern for school building maintenance which are closely associated with facilities which cater to the basic needs of occupants, namely physiological comfort. The difference may be because of their profession or role in maintenance.

It appears that the officers and school principals have a bird's eye view of the general needs to the building occupants. They see the roof has potentially having a knock on effect on the general safety and comfort of the building's occupants. If the roof was not properly maintained and it leaks, it would affect the ceiling, electrical system which poses a bigger threat if it is not instantly fixed, as principal Dominic (S07) alluded to in his response.

Dominic's basis of argument is shared by the education officers. For officer Neil (A5), he placed *'top priority for the roof/ceiling as it could compromise safety*

and lead to other damages’. Officer Larry (A3) described in more details how this is the case:

*We give priority to roof because it is at the top of the building. When it is at the top it involves other things. Especially in Malaysia, when it typically rains, the water would come through the open roof/ceiling. This would make the class uncondusive and both students and teachers alike would not be able to conduct teaching and learning process. Apart from that, since it is at the top, if the structure is not repaired, it is a safety factor to students, because it could fall down and others.*

#### 4.2.3.6 Fans: Rationales for importance

Meanwhile, the teachers and students shared the views that fans are among the main elements of maintenance considered important. One student expressed her views on the importance of fans to her learning process. For Daphne (S07), if it is hot, *‘this also disturbs us because we sweat, feel uncomfortable, hot, so we cannot focus like ‘it’s so hot, I cannot focus’.*

Although most of the interviews seem indicate that the typical purpose of fans seems to cool the occupants in the room thus creating a comfortable environment, another dimension of possible use was also highlighted. As one student group pointed out, the fan is a valuable tool utilised in their workshop in the completion of some tasks. As explained by a vocational student Harry (S16) *‘in part of our work, we need to use equipment, like with paint works, we can use the fans to dry the paint’.*



Photo 4-24: Wall fan in school workshop in S01 (left) and ceiling fans in science laboratory (right)



*Photo 4-25: Ceiling fans in classroom in S01 (left) and canteen in S04 (right)*

Apart from that, well-maintained fans are also important in ensuring that good ventilation is sustained in various venues in the school like the workshops or science laboratories (Photo 4-24), classrooms and even canteen (Photo 4-25).

#### **4.2.4 Condition of 6 most important aspects of school building**

Based on the ranked school building aspects which are deemed important by all the respondents, 6 items were identified, namely, roof, electrical, plumbing, toilet, water supply and fans. These aspects would be the basis for selecting items to be focused on from the overall 17 items of building maintenance aspects. This selection basis, which is similar to the previous section of urgent maintenance, is deemed appropriate in order to focus on what items of the school building is considered crucial and important to be discussed in this chapter, in light of the limitation of space in this research. The data analysis showed as follows:

##### **4.2.4.1 Electrical system**

Respondent	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	0	-	6	54.5	5	45.5	0	-
Principals	2	11.1	2	11.1	3	16.7	7	38.9	4	22.2	0	-
Teachers	5	2.8	17	9.4	60	33.3	66	36.7	29	16.1	3	1.7
Students	17	3.2	36	6.9	100	19.1	162	30.9	161	30.7	48	9.2

*Table 4-12: Electrical system condition*

From the result in Table 4-12, the majority seems to agree that the electrical system in their schools are at least 'Adequate'. Such findings were confirmed by

visual observations of electrical maintenance works that have been undertaken and thus they are in good condition in the schools visited as displayed in Photo 4-26.



*Photo 4-26: Electrical rewiring in S17 (left) and new switches in S08 (right)*

However, there seems to be some noticeable increase on the ‘Fair’ to ‘Extremely poor’ condition. This is perhaps due to one of the most common problem with the electrical system in some schools, which is the short circuiting that leads to electricity blackouts in certain parts of the school as mentioned by S13T07 and some interviewees.

#### 4.2.4.2 Toilet

Respondent	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	1	9.1	9	81.8	1	9.1	0	-
Principals	1	5.6	2	11.1	2	11.1	9	50.0	4	22.2	0	-
Teachers	3	1.7	18	10	49	27.2	75	41.7	31	17.2	4	2.2
Students	72	13.7	109	20.8	151	28.8	124	23.7	57	10.9	11	2.1

*Table 4-13: Toilet condition*

Although the majority of officers, principals and teacher felt that the toilet condition in their schools were ‘Adequate’, as presented in Table 4-13, such a view was not really shared by the students, the majority of whom thought it was ‘Fair’. It is evident that more than half of the students (63.3%) felt that the toilets condition ranges from ‘Fair’ to ‘Extremely poor’, indicating that it is a significant concern for them. This is substantiated by some interview which pointed out toilets as a major source of apprehension for the students, as mentioned by

student Hank (S16) who stated ‘*some toilets don’t have locks and there are broken flushes*’, which concurred with some notes found in few open-ended survey answers.



*Photo 4-27: Student toilet in S05 (left) and male student urinals in S07 (right)*

Nevertheless, from school walk-through observations as shown in Photo 4-27, the condition of the toilets in all the schools could be considered as ‘Adequate’ as indicated by the adults’ majority survey. Teacher Benjamin (S03) even remarked that the maintenance works undertaken in his school have resulted the girls’ hostel toilets looking ‘*beautiful like a hotel*’.

#### 4.2.4.3 Plumbing

Respondent	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	1	9.1	4	36.4	<b>6</b>	<b>54.5</b>	0	-
Principals	1	5.6	2	11.1	4	22.2	<b>8</b>	<b>44.4</b>	3	16.7	0	-
Teachers	1	0.6	12	6.7	44	24.4	<b>64</b>	<b>35.6</b>	54	30.0	5	2.8
Students	20	3.8	52	9.9	134	25.6	<b>161</b>	<b>30.7</b>	129	24.6	28	5.3

*Table 4-14: Plumbing condition*

The majority of each group in Table 4-14 felt that the condition of the school plumbing is ‘Adequate’, with the only exception being the officers who perceived that it is in a ‘Good’ condition, exemplified by examples seen in Photo 4-28.





*Photo 4-28: Plumbing and sink in S04 (left) and toilets in S01 (right)*

Nonetheless, analysis of the interview data also revealed several issues with regards to the condition of their respective schools' plumbing. In school S03, the issue is somewhat predictable, as there are old buildings and consequently aging pipework. According to its principal Benedict (S03), *'the piping was done in the 80s'*, and when it was damaged they had a look and discovered that *'the thickness of the rust [inside] is very high'*. Benjamin (S03), one of his teachers, said that *'it is a common problem when it is an old school that the pipe breaks here and there'*, but it could become a bigger problem when it breaks and *'goes into the building [wall]'*.

In another school (S14), despite its newly built status, principal Gabriella stated that there is still an issue with the plumbing, which is noticeable as water seepage can be seen on the wall, in the toilet and other areas. In school S12, the researcher witnessed first-hand the types of problem associated with the plumbing and maintenance work that followed (Photo 4-29). Perhaps, one of the biggest challenge is that these pipes are mostly located underground or installed within the buildings. In the case of his school, as teacher Benjamin (S03) argued earlier, it is even worse and much more difficult to fix plumbing in the wall than installing a new one.



*Photo 4-29: Leaking school water pipes (left) and repaired in S12 (right)*

#### 4.2.4.4 Water supply

Respondent	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	0	-	4	36.4	7	63.6	0	-
Principals	0	-	3	16.7	1	5.6	7	38.9	7	38.9	0	-
Teachers	2	1.1	13	7.2	33	18.3	70	38.9	56	31.1	6	3.3
Students	31	5.9	78	14.9	141	26.9	136	26	99	18.9	39	7.4

Table 4-15: Water supply condition

The findings in Table 4-15 showed that majority of officers, principals and teachers are of the opinion that water is either 'Good' or 'Adequate' in their school. Perusal of maintenance files and record in the schools as shown in Appendix 21 appear to indicate maintenance works related to the water supply involving main water tank and water pump stations (Photo 4-30) were conducted in 5 schools (S03, S05, S07, S13 and S18). However, a significant percentage of students seem to disagree, stating that water supply is in a 'Fair' to 'Extremely poor' category which is 47.7%, in comparison to 'Excellent' to 'Adequate' which stands at 52.3%.



Photo 4-30: School main elevated water tank in S07 (left) and water pumping stations in S12 (right)

Further analysis of the interview data found several corroborative comments by some students in some schools. In school S14, few of the students voiced their opinion on the matter. Student Gwen complained that '*usually there is no water at the start and end of the school semester*'. Her friend Gary (S14) added that the issue usually occurs at the hostel, which is '*so problematic*' as he further explained:

*When I have a stomach ache and need to go to the toilet, I need to go to the School Hall. That is the only sole place that has water. It is so far... If it is the hall, at night? In the early morning, we have to walk and take our shower at the hall, at the end of the workshop block. So we are worried about our safety.*

A similar problem was also shared by two students of school S09, Eric and Evan, who relayed their dissatisfaction with the condition of the water supply system in their school. Eric described that when the students went to the toilets to wash their hand or ‘do their business’ and there is no water, ‘it becomes a problem and an inconvenience’. Consequently, as elaborated by Evan, ‘if there is no water, it is either we have to hold it, bring our own water from home or do not go to the toilet’. Evan explained that although ‘usually there is water provided by the school in a big large container’, no pails were provided to take water to the toilet cubicle. This resulted in students, especially in the evening session, having to bring their own container or water from home to use in the toilet and for prayer ablution.

#### 4.2.4.5 Roof

Respondent	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	0	-	6	54.5	5	45.5	0	-
Principals	0	-	0	-	2	11.1	9	50.0	7	38.9	0	-
Teachers	0	-	5	2.8	16	8.9	63	35	86	47.8	10	5.6
Students	5	1	6	1.1	50	9.5	176	33.6	223	42.6	64	12.2

Table 4-16: Roof condition

As shown in Table 4-16, the majority of the respondents, from each group type, agree that the roof condition of their school buildings is within the ‘Adequate’ to ‘Excellent’ condition. The visual inspection of all the schools seems to validate such findings as represented in Photo 4-31. Perhaps this is due to the high priority given by the MOEM, SED, DEO and principal in the event of any defects or incidents associated with the roof of the school building, which would be mostly given immediate attention and maintenance. In addition, according to officer Larry (A3), the second priority in the long-term maintenance planning is



roof replacement. He explained that this is due to the local weather with its *‘frequent rain and hot sun, the roofs are easily damaged’*, which *‘we have to replace every 10 years’*. Due to the above mentioned actions, the condition of the roofs, as expected, are in a relatively good condition.



*Photo 4-31: Recently replaced roof in S03 (left) and existing roof in S01 (right)*

#### 4.2.4.6 Fans

Respondent	Extremely Poor		Poor		Fair		Adequate		Good		Excellent	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	0	-	5	45.5	6	54.5	0	-
Principals	0	-	0	-	4	22.2	7	38.9	6	33.3	1	5.6
Teachers	2	1.1	7	3.9	30	16.7	68	37.8	61	33.9	12	6.7
Students	14	2.7	35	6.7	95	18.1	143	27.3	166	31.7	71	13.5

*Table 4-17: Fans condition*

It is the end users (teachers and students) who considered this aspect of ventilation/fans as urgent and important. This is perhaps evident from the rank of importance in Table 4-11. Nonetheless, the condition of ventilation/fans in the classrooms are majority in ‘Adequate’ to ‘Excellent’ state as shown from the findings in Table 4-17, and further confirmed via visual observation of their condition as exemplified by Photo 4-32.



*Photo 4-32: New ceiling fan installed (left) and its typical location classroom in S14 (right)*

However, from observations and interviews gathered from the schools, there is one school (S06) which had to place extra fans due to its abnormal classroom size. According to student Carla (S06), *'the classroom is the biggest class' as 'there were four beams in our class, which normally should be three beams'*. She guessed that *'it was probably a lab before' and 'was refurbished' into a classroom*. Her colleague Cathy (S06) explained further how it affected them:

*Because of the size of the class, in which there are four ceiling fans, and the first three are commonly used. At the back, the last fan, is not commonly used but it is the fastest, giving the coolest air among the four. Because of that, we tend to move at the back in order to learn. Even the teachers tend to move to the back when teaching because it is cooler at the back. The three front fans are much slower and a little bit noisy... The noise from the fans are not that much but people preferred to sit at the back. Some pulled the chairs to the back.*

It appears that the ceiling fans located in the middle of their classroom like in Photo 4-32 were inadequate especially during the midday till afternoon. Hence, Carla said that they took initiative to bring their *'own table fans'* that are *'extras from home'*, which were *'plugged in the classroom'* and *'put it on the chairs'*. Carla also mentioned that *'we are not sure what the schools think [but] our teachers are fine with it'*. Their situation has not gone unnoticed by their school principal, Cameron (S06) who understood the situation well.

*The fans are located in the middle of the class, so students sitting on the sides won't feel it. So there are a few students who brought their own fan because they couldn't stand the heat. They can't stand it anymore because of the sweat and it is uncomfortable to learn. So they took their own initiatives and bring their own fans.*

In this specific case, it is perhaps an isolated case as the abnormal size of the classroom exacerbated the hot situation caused by the tropical weather. In general however, fans in all schools observed were in good condition.

#### **4.2.5 Key findings**

The key findings for this section are as follows:

**The school buildings are in good condition.**

### **4.3 Satisfaction level of school building condition**

In this section, the respondents' agreement with the following statements were used to gauge their satisfaction level of their school building, in terms of its maintenance level, comfort level, appearance, cleanliness, space and adequacy to support learning. The findings are as follows:

#### **4.3.1 Regularly maintained**

Respondent	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	1	9.1	<b>10</b>	<b>90.9</b>	0	-
Principals	0	-	3	16.7	7	38.9	<b>8</b>	<b>44.4</b>
Teachers	6	3.3	61	33.9	<b>97</b>	<b>53.9</b>	16	8.9
Students	33	6.3	197	37.6	<b>247</b>	<b>47.1</b>	47	9.0

*Table 4-18: Regularly maintained*

The majority of respondents of each respondent group as shown in Table 4-18 was satisfied that their schools are regularly maintained by the respective school leaders. This was further substantiated by some of the interviewees in one of the school. Principal Harrison (S16) stated that his school *'carry out maintenance routinely'*, citing aspects like *'windows, toilets, electrical system and other minor maintenance'*. His statement is validated by Heidi, one of his students, who said that *'the maintenance of this school building is ok and I'm satisfied'*. Student Carl (S06) in another school also said that he was satisfied with the school building maintenance in his school. Walk-through observations of this school (Photo 4-33) and document reviews of other schools (Photo 4-34) seem to support such a notion.



*Photo 4-33: Regularly maintained school (S16)*



*Photo 4-34: Documents review: Maintenance work before (left) and after (right) in S13*

### 4.3.2 Comfortable

Respondent	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	2	18.2	7	63.6	2	18.2
Principals	0	-	4	22.2	9	50.0	5	27.8
Teachers	1	0.6	39	21.7	124	68.9	16	8.9
Students	4	0.8	92	17.6	398	76.0	30	5.7

Table 4-19: Building is comfortable

As indicated in Table 4-19, the majority of the respondents for each group were satisfied that their school building is comfortable. Stating his opinion on the subject, student Calvin (S06) remarked that he was very satisfied with his school building condition as he needed a good and comfortable environment, which his school offered. His friend Carla emphasised that *‘the school needs to be comfortable, especially the classroom’*, which *‘also must have all the important factors for conducive learning session’*. A typical example of a classroom like in school S07 (Photo 4-35) reflected such comfortable condition, which is afforded by the mixture of vital aspects like adequate natural lighting, artificial lightings, good natural ventilation and ceiling fans. It is this *‘comfort’* that student Daphne (S07) consider as essential *‘to help us focus in our learning’*.



Photo 4-35: Comfortable classroom with good light and ventilation (S07)



### 4.3.3 Pleasant appearance

Respondent	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	9	81.8	2	18.2
Principals	0	-	1	5.6	10	55.6	7	38.9
Teachers	1	0.6	25	13.9	117	65.0	37	20.6
Students	7	1.3	98	18.7	322	61.5	97	18.5

Table 4-20: Building pleasing in appearance

The majority of the respondents for each group were also satisfied that their school building is pleasing in appearance as Table 4-20 demonstrated. Student Calvin (S06) described that *‘not only my school is pleasant on the eyes, but it has won several awards, for example, the excellent hostel award [and] we won the first place for two years in a row’*. The formal accolades that the school received in recognition of its pleasant appearance further strengthen such claim. Visual observations carried out in all the schools validated the perception that all the schools are generally pleasant visually, as illustrated in Photo 4-36, which exemplify the pleasant looks of the school buildings in general.



Photo 4-36: Pleasant appearance in S13 (left) and in S011 (right)

The pleasant appearance was also enhanced further with the colourful murals paintings by the students as shown in Photo 4-37, which were a constant feature visible in virtually all the schools visited.



Photo 4-37: Mural paintings by students in S07 (left) and S09 (right)

Perhaps what is interesting is that pleasant appearance was also deemed important to other stakeholders too. Principal Benedict (S03) recounted his own experience in some schools he visited where *'we can see the peeled off paints even on the ground'*. The impression that he got was *'Is the principal that bad?'* Officer Kenny (A2) was also aware of the negative public perception that would occur if school building maintenance was not addressed. Student Daisy (S07) shared her views on the importance of the physical condition of the school stating that when parents come to school, *'they will like to see the tidiness and comfort for their children'* and *'would not expect to see an old school which looks dismal'* as today's parents placed a great emphasis on their children's education and the cheerful condition of the school they sent their children to. Officer Kenny (A2) concurred with Daisy's opinion, explaining that *'the public nowadays also takes into account the school physical condition and its facilities as one of the priority in choosing a school'*.

#### 4.3.4 Neat and clean

Respondent	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	0	-	10	90.9	1	9.1
Principals	0	-	1	5.6	12	66.7	5	27.8
Teachers	0	-	32	17.8	118	65.6	30	16.7
Students	9	1.7	129	24.6	325	62.0	61	11.6

Table 4-21: Building is neat and clean

In Table 4-21, the majority of the respondents for each group were satisfied that the school buildings in all 18 schools are generally in a neat and clean condition, as exemplified by some observations like Photo 4-38. Perhaps it is these same characteristics that made student Cathy (S06) arrived at her first impression of her school as being *‘beautiful and cheerful’*, which could *‘guarantee the students who come here to study with high enthusiasm because the school is perfect at the first glance’*. Her friend, Carl (S06), also noticed that *‘the toilets are cleaned every morning and afternoon by the workers’*. For him, this is important as *‘our comfort of being a student here would be disrupted’*.



Photo 4-38: Neat and clean buildings and surroundings (left) and corridors in S10 (right)

#### 4.3.5 Enough teaching and learning space

Respondent	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	4	36.4	5	45.5	2	18.2
Principals	0	-	3	16.7	4	22.2	11	61.1
Teachers	2	1.1	41	22.8	108	60.0	29	16.1
Students	13	2.5	83	15.8	314	59.9	114	21.8

Table 4-22: Enough teaching and learning space

The majority of the respondents of each group in Table 4-22 agreed that there was enough space for teaching and learning in all the schools surveyed. This is exemplified by student Chris (S06), who was impressed with the school itself, which has many facilities like school field, *‘beautiful school hall, prayer building facilities and the classroom itself which is spacious and easy for us to learn’*. The visual observation of all the schools seems to correspond to the above findings from the quantitative data as basic learning spaces for teaching and



learning like classrooms, science laboratories, lecture rooms and workshops (Photo 4-39) are in good condition to adequately cater to the students' needs.



Photo 4-39: Lecture room in S01 (left) and workshops in S02 (right)

#### 4.3.6 Adequate to support learning

Respondent	Strongly Disagree		Disagree		Agree		Strongly Agree	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	2	18.2	7	63.6	2	18.2
Principals	1	5.6	4	22.2	4	22.2	9	50.0
Teachers	2	1.1	47	26.1	104	57.8	27	15.0
Students	13	2.5	99	18.9	326	62.2	86	16.4

Table 4-23: Adequate to support learning

In terms of its adequacy to support learning, the majority of each group of respondents felt that the schools are in such position as demonstrated in Table 4-23. As student Calvin (S06) remarked, *'the school provides me with everything I need to make my learning easier'*. These include well-maintained facilities to support learning like school computer laboratory and school library (Photo 4-40) which were observed in all the schools.



Photo 4-40: School computer laboratory in S07 (left) and library in S04 (right)

#### **4.3.7 Classroom aspects**

The satisfaction level of the respondents towards the following classroom aspects of artificial lighting, ventilation, provision of fans, indoor air quality (IAQ), and condition of ceilings, floors, walls, windows and doors were also surveyed. These aspects are major classroom factors which have been identified by previous research as significant in the teaching and learning process. As previously mentioned in section 2.21, in this case, the survey results as shown in Table 4-24 revealed that significant majority of each respondent groups is satisfied with the condition of their lighting, ventilation, fans, internal air quality and condition of their floors, walls, windows and doors. As student Anna (S01) said during the interview, *'We think everything is okay.'*

Nonetheless, there are still some minorities who were unsatisfied. A case in point can be exemplified by the aspect of fans. While a sizeable majority of each group of respondents was satisfied with the provision of fans in their own schools, student Brooke (S01) suggested that *'when maintaining the fans, if possible, replace them with new fans because the old design model fans rotate slowly'*. She explained that *'especially during midday, we could really feel the heat'*. In addition, she also suggested the number of fans to be added in the classroom, which currently have *'three [ceiling] fans in the classroom but all of them are in the middle'*, resulting in *'all this while only the ones sitting in the middle can feel the cool air from the fans'*. In order to address this, she proposed that *'they [school administration] should add wall fans for the students who sit on the side so they could also feel the cool air from the fans'*. Perhaps students like Brooke (S01) and similarly Carla (S06) and Cathy (S06) as mentioned in 4.2.4.6 represent the small minority of unsatisfied end users, which based on the aforementioned explanations, have a valid basis to disagree with the rest. After all, there are few important factors that are more critical in generating a conducive classroom environment to enable the teaching and learning process to be effective, one of which according to student Daphne (S07) is *'comfort'*, which *'is vital to help us focus in our learning'*, as aforementioned in section 4.3.2 earlier.

Classroom Aspect	Respondent	Very Unsatisfied		Unsatisfied		Satisfied		Very Satisfied	
		No.	%	No.	%	No.	%	No.	%
Artificial lighting	Officers	0	-	0	-	9	81.8	2	18.2
	Principals	0	-	3	16.7	8	44.4	7	38.9
	Teachers	0	-	26	14.4	129	71.7	25	13.9
	Students	3	0.6	38	7.3	353	67.4	130	24.8
Ventilation	Officers	0	-	0	-	6	54.5	5	45.5
	Principals	0	-	0	-	9	50.0	9	50.0
	Teachers	0	-	18	10.0	123	68.3	39	21.7
	Students	16	3.1	85	16.2	309	59.0	114	21.8
Fans	Officers	0	-	0	-	9	81.8	2	18.2
	Principals	0	-	3	16.7	10	55.6	5	27.8
	Teachers	3	1.7	47	26.1	110	61.1	20	11.1
	Students	27	5.2	130	24.8	263	50.2	104	19.8
Internal air quality (IAQ)	Officers	0	-	0	-	10	90.9	1	9.1
	Principals	0	-	1	5.6	9	50.0	8	44.4
	Teachers	3	1.7	19	10.6	132	73.3	26	14.4
	Students	16	3.1	107	20.4	310	59.2	91	17.4
Ceilings, floors, walls, windows and doors	Officers	0	-	1	9.1	10	90.9	0	-
	Principals	0	-	6	33.3	11	61.1	1	5.6
	Teachers	5	2.8	57	31.7	109	60.6	9	5.0
	Students	10	1.9	131	25.0	319	60.9	64	12.2

*Table 4-24: Satisfaction level of classroom aspects*

#### 4.3.8 Key findings

The key findings for this section are as follow:

**The school buildings are well-maintained.**

**Classrooms conditions are satisfactory and school buildings are comfortable for teaching and learning.**

#### 4.4 Other effects of school building condition:

The school building condition could also affect the ability of the school in several ways. In this particular section, the effects were examined in terms of the schools' abilities to offer extended learning period, maintain a safe and orderly environment, and create positive school climate. Besides these, the section also examines two other potential effects, by evaluating the school facilities in meeting the educational programme needs and what effect it has on pride and other feelings.

##### 4.4.1 Offer extended learning time

Respondent	No Impact		Small Impact		Medium Impact		Huge Impact	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	3	27.3	3	27.3	5	45.4
Principals	0	-	2	11.1	4	22.2	12	66.7
Teachers	9	5.0	29	16.1	78	43.3	64	35.6
Students	46	8.8	121	23.1	271	51.7	86	16.4

*Table 4-25: Ability to offer extended learning time*

With regards to how the school building condition affects the schools' ability to offer extended learning time, Table 4-25 shows that each type of respondents thought that it has a 'medium' to 'huge impact'. This was also evident in the interview of one student who cited the importance of lighting and fans, particularly to most students who are hostel occupants. In student Brooke's (S01) case as mentioned in section 4.2.3.1, typically like many other hostel occupants, they are required to go to the preparatory class in the assigned classroom in the school building blocks every school night. In this case, school building condition does have a huge impact on the ability of the school to offer extended learning time to the students, especially those living in the school hostels. In the background of such cases, it is possible to see maintenance playing a key role in ensuring that the school is able to offer extended learning time for the students.

#### 4.4.2 Maintain safe and orderly environment

Respondent	No Impact		Small Impact		Medium Impact		Huge Impact	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	1	9.1	4	36.4	6	54.5
Principals	0	-	0	-	8	44.4	10	55.6
Teachers	5	2.8	25	13.9	64	35.6	86	47.8
Students	16	3.1	91	17.4	246	46.9	171	32.6

Table 4-26: Maintain safe and orderly environment

In terms of how the physical condition of the school affects the schools' ability to maintain an adequately safe and orderly environment, the majority of each type of respondents felt that it also has a 'medium' to 'huge impact', as indicated in Table 4-26. An argument by student Dylan (S07), who stays in the school hostel, puts this into perspective. He argued that *'the most important thing is the electrical wiring system in the school [because] at night, if there is water, but there is no light, people would be scared to go to the toilet, so it does affect'*. He has a strong case considering all hostel students are typically required to go to preparatory class held in their classrooms in the school block at night.

#### 4.4.3 Create and support positive school climate

Respondent	No Impact		Small Impact		Medium Impact		Huge Impact	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	1	9.0	5	45.5	5	45.5
Principals	0	-	0	-	3	16.7	15	83.3
Teachers	6	3.3	25	13.9	76	42.2	73	40.6
Students	15	2.9	92	17.6	297	56.6	120	22.9

Table 4-27: Create and support positive school climate

With reference to how the school physical condition affects the schools' ability to create and support positive school climate, the survey result in Table 4-27 showed that it has a medium to huge impact, according to the majority of each group of respondents. An argument offered by principal Gabriella (S14), perhaps alluded to this point.

*The physical condition of the school is important. If we want to give education to these children, the basic requirement is the physical facilities. For instance in class, the power sockets should be good, the windows should be good and the fans should be adequate...Because for me, the physical issue is basic. It is the foundation of success for the students. When the students are comfortable and the facilities are in good condition, they would feel excited in school because the classroom facilities like the fans are adequate and the sockets are working, right? The teachers could then carry out any activities without any disruptions.*

Principal Gabriella's opinion above which places physical facilities as a prime ingredient in providing education is commonly shared by many, not only by her counterparts in other schools, but also teachers, students and officers interviewed. It is perhaps not far-fetched to imagine that when every physical facilities offered in schools are working as they are supposed to, inevitably this, to a certain extent, could help to create and support a positive school climate. As teacher Abraham (S01) was keen to emphasise '*if the school building is not properly maintained or in a dire condition, of course the conducive environment is not created, causing failure to the learning system*'. In this case, they argued that the condition of the school facilities could be attributed to the maintenance undertaken by the school.

#### 4.4.4 Meet educational programme needs

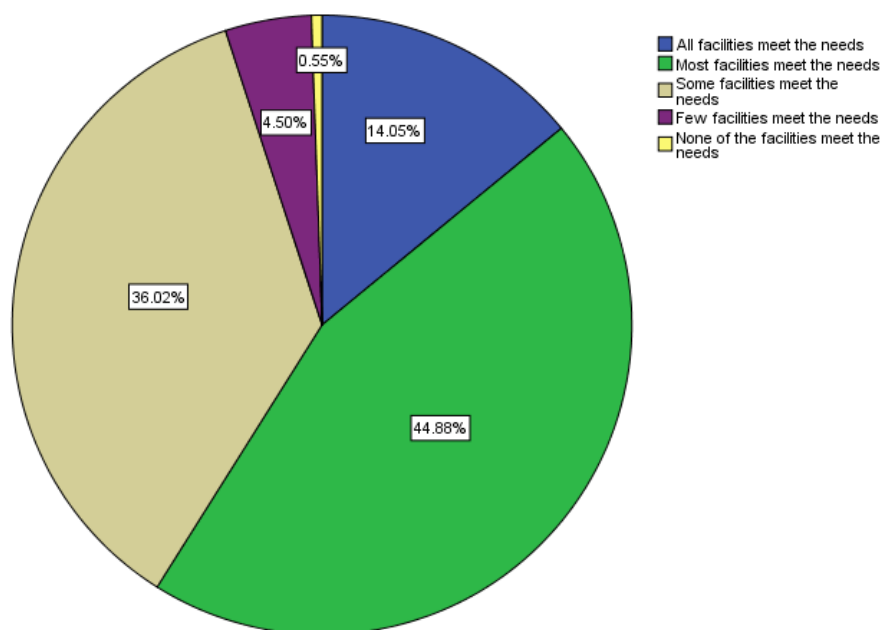


Figure 4-3: Meet educational programme needs

As demonstrated in Figure 4-3, the majority of respondents (44.88%) felt that most of the school facilities meet the needs of the educational programmes. This was followed by a substantial 36% who felt that some facilities in the schools also meet such needs.

Respondent	All facilities		Most facilities		Some facilities		Few facilities		None	
	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	4	36.4	5	45.5	2	18.1	0	-	0	-
Principals	2	11.1	11	61.1	5	27.8	0	-	0	-
Teachers	30	16.7	88	48.9	53	29.4	9	5.0	0	-
Students	67	12.8	225	42.9	204	38.9	24	4.6	4	0.8

Table 4-28: Meet educational programme needs (Respondent type)

Further analysis in Table 4-28 revealed the majority of each type of respondents also shared the same opinion. With the continuous maintenance programme conducted by MOEM throughout the year as disclosed by officer James (A1), it is not surprising that most of the school buildings are in a relatively good condition and thus be able to meet the needs of the educational programme. Such cases in point are like the good condition of general classrooms, and

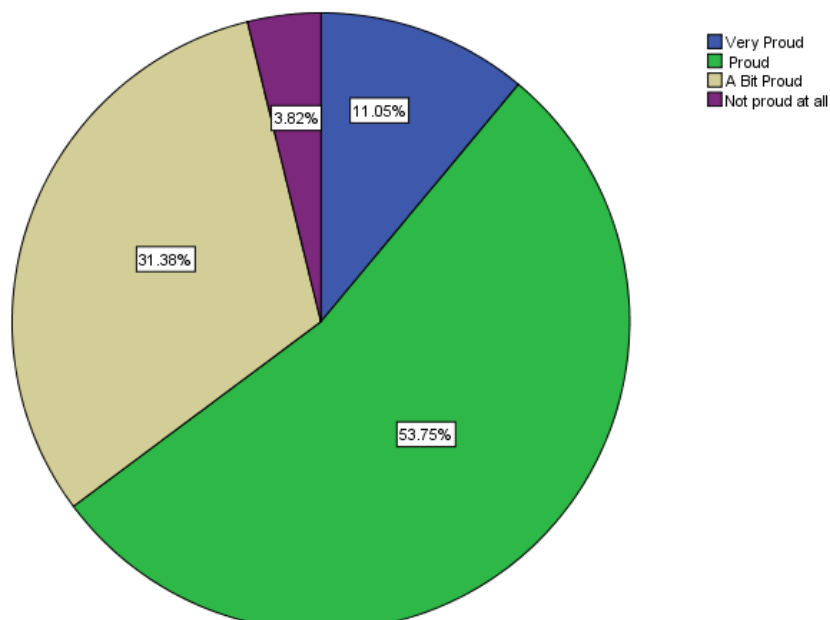
science laboratories and art room (Photo 4-41) observed during the study, where they currently are able to meet the needs of both general and specific educational programme respectively.



*Photo 4-41: School science laboratory (left) and visual arts room in S07 (right)*

#### **4.4.5 Affect personal emotions and feelings**

Another effect of the school building is perhaps related to the personal emotions and feelings of the persons who are affected by either the school building condition or its school building maintenance or both. One of the survey questions touched on this in exploring pride towards the school buildings.



*Figure 4-4: Proud of the school building condition*

The survey result in Figure 4-4 shows that the majority of the overall respondents (53.75%) were proud of their school building. This was followed by



quite a substantial percentage (31%) who also felt a bit proud of the overall condition of their school buildings.

Respondent	Very proud		Proud		A bit proud		Not proud at all	
	No.	%	No.	%	No.	%	No.	%
Officers	1	9.1	10	90.9	0	-	0	-
Principals	4	22.2	10	55.6	4	22.2	0	-
Teachers	26	14.4	101	56.1	49	27.2	4	2.3
Students	50	9.5	273	52.1	177	33.8	24	4.6

Table 4-29: Proud of school buildings

Further analysis by respondent type (Table 4-29) also shows that the majority of each cluster of respondents are also proud of the overall condition of their respective school buildings. Interview data with some respondents also seems to correspond to such feeling of pride as follows:



Photo 4-42: Building condition of one vocational school (S01)

Teacher Abraham (S01) expressed his pride in his school as shown in Photo 4-42, as *'its buildings are still beautiful, appear updated and modern in comparison to others'*. In another school, student Calvin (S06) was also beaming with pride from his description of his school.

*I am very proud of my school. Not only my school is pleasant on the eyes but it has won several awards, for example, the excellent hostel award. We won the first place for two years in a row.*

Calvin's response seems to suggest that the overall school physical appearance is very important in instilling the sense of pride of this student. This feeling of pride is further boosted as the award provides the formal recognition of the school's achievement in maintaining a pleasant appearance.

Nevertheless, analysis of the interview appears to suggest that the school building condition and the action or inaction of maintenance, perhaps incited a variety of peoples' responses, in the form of negative or positive feelings and emotions, some of which are shown in Appendix 24.

For instance, principal Elizabeth (S09) recalled the '*stressed out*' teacher in her school who was unable to carry out her practical Home Economic sessions due to lack of water. When maintenance related issues affecting school building condition cannot be resolved, she recounted that the only thing she could do was to '*smile*' or '*laugh*' with her staff.

Student Bella (S03) also claimed that '*school building maintenance has an impact on her as a student*'. For her, '*if lighting was not available, we cannot learn, time is wasted, delaying our study*'. According to her, '*students are not supposed to be in that situation*', and thus '*the school should act and carry out the maintenance immediately*'. One could perhaps sense frustration in her comments. Perhaps a more detailed description by student Evan (S09) offered a glimpse of a student's mixed emotions with the water supply disruption associated with maintenance:

*There is a feeling of disappointment. Feeling worry. Feeling guilty too. Because if we report to the teacher, he might be angry with us because we could appear to be complaining a lot as there have been lots of complaints to the teachers about the water issue. The students are angry that the water pump was not replaced.*

On a more positive note, Elizabeth's counterpart in S14, Gabriella, can imagine how '*excited*' students would be in school when they are '*comfortable and the facilities are in good condition*', because '*the classroom facilities like the fans are adequate and the sockets are working*' (Gabriella, S14 principal). Principal Elizabeth herself also felt '*excited*' and '*relieved*' with the availability and

willingness of her students in assisting the school in addressing some maintenance issue with the skills learnt from their course in school.

In sum, one could perhaps conclude that the above examples and the ones stated in Appendix 24 alluded to the potential impacts of school building condition or school building maintenance on the emotions and feeling of many stakeholders.

#### **4.4.6 Key findings**

The key findings for this section are as follow:

**School building maintenance affects school buildings, teaching and learning environment, as well as occupants.**

#### **4.5 Current maintenance practices**

The following sub-sections will discuss the findings with regards to the current maintenance practices which include the following: a) maintenance policy; b) planning; c) type of maintenance; d) organisation; e) processes and procedures; f) resources; and g) creativity and innovation.

##### **4.5.1 Maintenance policy**

The following explanation by officer James (A1), who was vastly experienced in the coordination of physical development including various school maintenance projects of MOEM, offered a perspective on the government policy on maintenance. According to officer James (A1), *‘with regards to the government policy, the development and maintenance of school buildings is a continuous programme, which is carried out from time to time via monitoring by the schools, DEO, SED and MOE*. He further elaborated that *‘if we observe the current government’s policy, it requires maintenance for all government buildings so that these minor defects are rectified at the early stage, thus enabling the building to last longer, by carrying out scheduled maintenance’*.

James's view on the government's continuous efforts on school building maintenance is further supported by another official, Larry (A3), who cited the National Budget in 2011, 2012 and others where '*special allocations for the purpose of school building maintenance*' under '*the Special Incentive Package*' as further additional evidence that '*this matter is a priority under the government*'. The federal government policy on placing importance on the school building maintenance is exemplified by the amount of maintenance allocations given to schools (Appendix 21).

At the school level, the opinions on the government's policy on school maintenance is shared by some school principals. Principal Cameron (S06) believed that '*the [federal] government policy on school building maintenance is that it is a major focus*'. This is manifested in the '*allocations every year, through the Ministry and its Divisions, SED and DEO*'. To him, '*the policy is clear, that is always assisting schools in managing maintenance aspects*'.

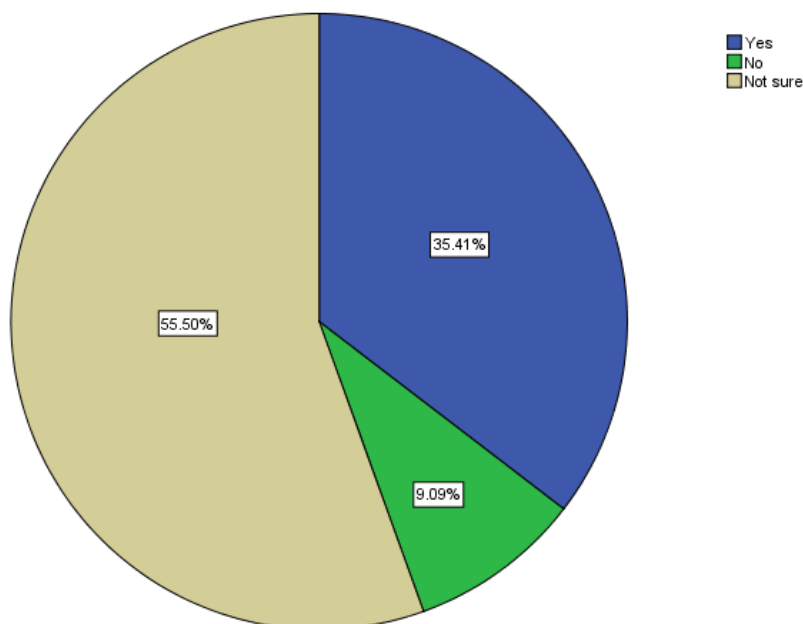


Figure 4-5: Any school building maintenance policy document?

Nevertheless, when asked about whether there is any policy document being used as the main reference in maintaining school building in their school or agency, the majority of the respondents (55.5%) were unsure as illustrated in Figure 4-5.

For instance, stakeholders like teacher Desmond (S07) felt that there is a need to establish a standard operating procedure (SOP) on how to maintain schools.

He wondered whether there is *‘an expiry date for certain school block’* or *‘do you have a rule like a car, like every 5 years you change, so after 30 years, you build a new building for the school to replace the old ones’*.

Nonetheless, as pointed out by principal Cameron (S06), there are some formal policy documents and circulars which indirectly indicate the importance of maintenance of the school building. He cited the existence of *‘circular on safety of the building or the students while in the school compound’*. The main policy and programme mentioned by him was *‘3K Programme, namely School Safety, Health and Beautification Programme’*. This nationwide 3K programme was also observed in some other schools like S07, which dedicated a corner for this at the school canteen as shown in Photo 4-43. In all the vocational schools, an additional 5S (sort, straighten, shine, standardise and sustain) policy was also implemented aimed at generating a conducive environment for effective work as one additional initiative that could contribute to the maintenance efforts in schools, as evidenced by the signage found in school S01 (Photo 4-44).



Photo 4-43: 3K Programme information corner in canteen in S07

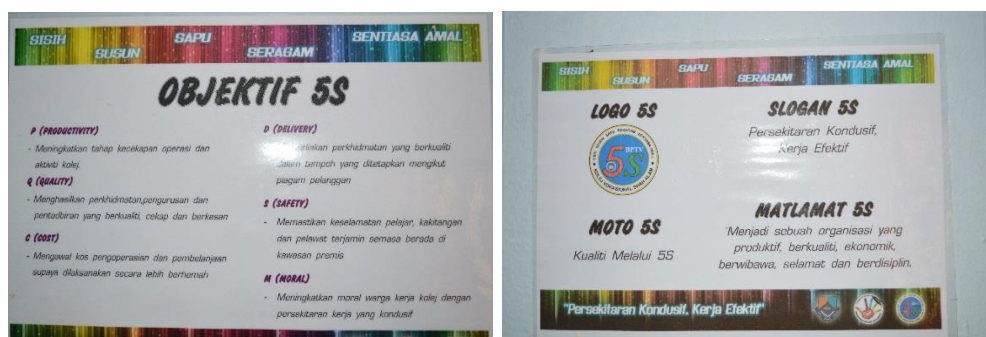


Photo 4-44: 5S Policy poster (S01)

#### 4.5.2 Maintenance planning

In terms of maintenance planning, there are five aspects that were examined in the study: a) the existence of any written document for school building maintenance; b) whether it is included in overall organisational planning; c) its priority level; d) its primary purpose; and e) frequency of update. Each of its findings is presented as follows.

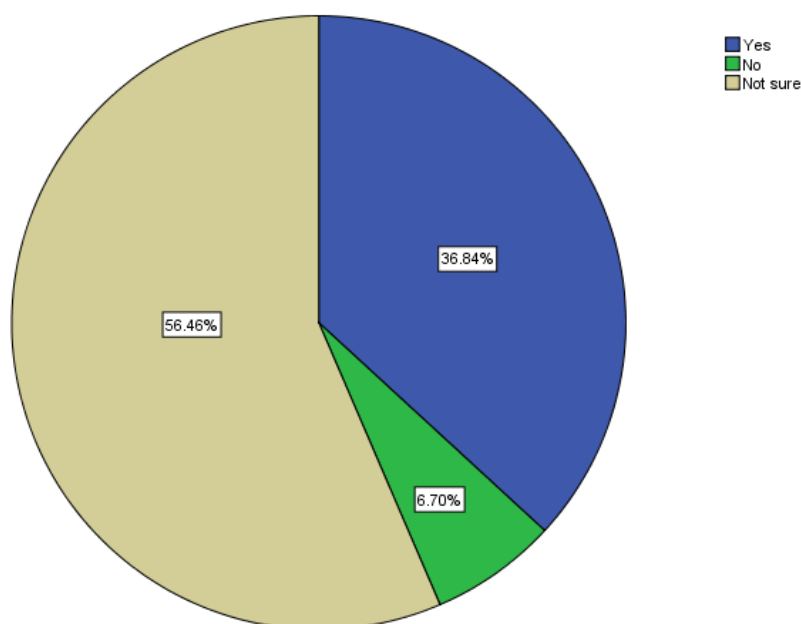
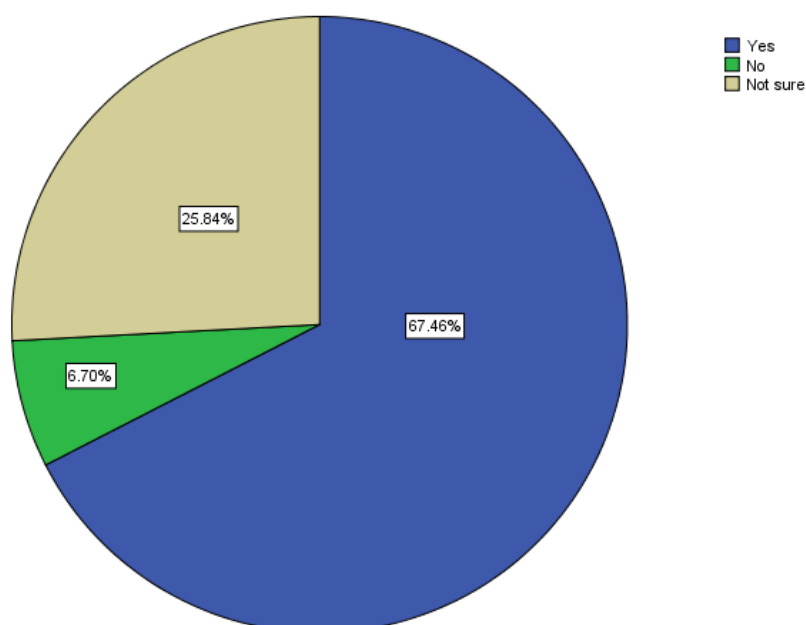


Figure 4-6: Written school building maintenance planning document

Firstly, the findings revealed that the majority of the respondents (56%) were unsure whether their respective school has a written document for school building maintenance planning as illustrated in Figure 4-6. This is followed by nearly 37% who explained that they did possess a written school building maintenance planning document. As clarified by principal Cameron (S06), *'for short-term, we have several documents'* related to school maintenance planning, comprised of *'checklist'* and *'complaints record made by students, staff or teachers'*. He explained that *'for long-term, we planned what are the necessary steps to be taken to determine the needs'*. This is done by estimating the needs of future maintenance like electrical rewiring and plumbing system and *'planned from now the possibility that there is problem with it due to its age, life span or natural causes'*. Similarly, principal Anderson (S01) also stated that

*'for the long-term, we have prepared a long list of maintenance works that we want to carry out, for the building, electricity and others'.*



*Figure 4-7: Is school building maintenance planning a component of organisational planning?*

The study findings also demonstrated that the majority of the respondents (67.5%) believed that school building maintenance planning is one element of an overall organisational planning for their respective school or agency as illustrated in Figure 4-7. For the officers, all the agencies involved in the study are essentially involved in the maintenance planning in one form or other. For the school principal, as explained by Cameron (S06), it is one of the main responsibilities under their job description, normally under the scope of management of the school physical environment.

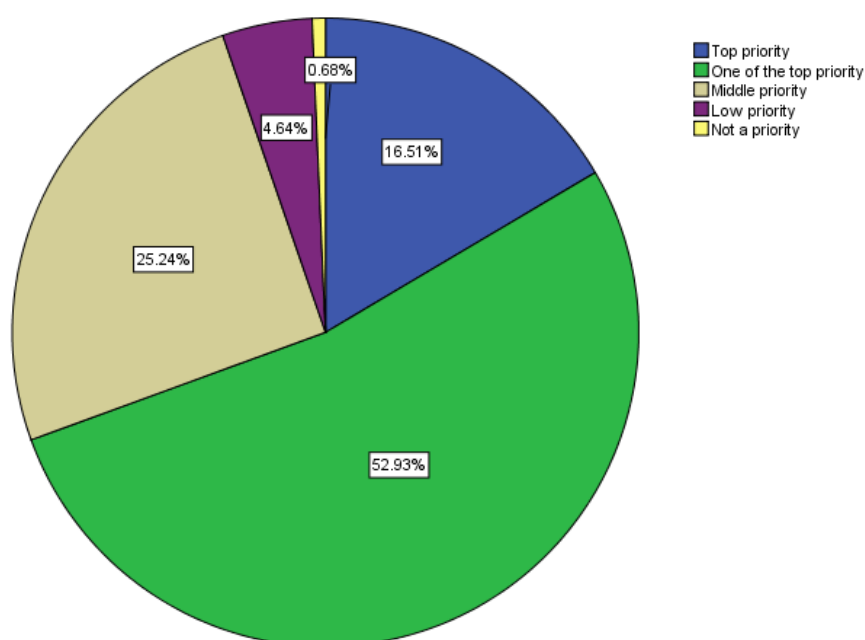


Figure 4-8: Building maintenance as school/agency priority

Respondent	Top priority		One of top priority		Middle priority		Low priority		Not a priority	
	No.	%	No.	%	No.	%	No.	%	No.	%
Officers	7	63.6	4	36.4	0	-	0	-	0	-
Principals	3	16.7	14	77.8	1	5.5	0	-	0	-
Teachers	35	19.4	115	63.9	28	15.6	2	1.1	0	-
Students	76	14.5	255	48.7	156	29.8	32	6.0	5	1.0

Table 4-30: Building maintenance as school/agency priority (Respondent type)

In terms of priority of maintenance, the questionnaire outcome indicated that majority of the respondents (52.9%) felt that maintenance is one of the top priorities on the organisational agenda of the school or agency as demonstrated in Figure 4-8. However, further examination (Table 4-30) revealed some slight difference.

For most agencies, the majority of officers said it is their top priority. This is due to the fact that all the officers were in charge of the school physical condition and development. This is exemplified by officer Neil (A5) who explained, ‘as I am under the Asset and Facilities unit, we are in charge of maintenance, therefore it is given a top priority’.

At the school level, principal Cameron (S06) offered some clarifications as to why school maintenance is one of the top priorities, instead of the top priority:



*We are in education. Of course our strategic planning is firstly curriculum. But for building, maintenance is under the facilities management section of our responsibilities as principal. So, I still put it as one of the main priorities of the school.*

Teacher Benjamin (S03), who was also a senior assistant, concurred saying that this was also the case for his school, saying that ‘*if we were to rank it, maintenance would be in the second place*’. In his opinion, ‘*in terms of the management, maintenance is one of the issue that we looked at*’.

At the student level, students like Cathy (S06) believed that his school, which was led by principal Cameron (S06), took maintenance seriously:

*The school administrators always keep this issue as a top issue in our school. The students in this school is always very comfortable because the administrators always give priority to students’ comfort. They understand that students need to be comfortable enough for them to be able to involve themselves in schools’ activities and classes when it is going on and our school administrators always take this issue as a very important issue for the students here.*

When asked further as to the basis of making such claim, Cathy (S06) explained that it was based on her observations of many things that happened:

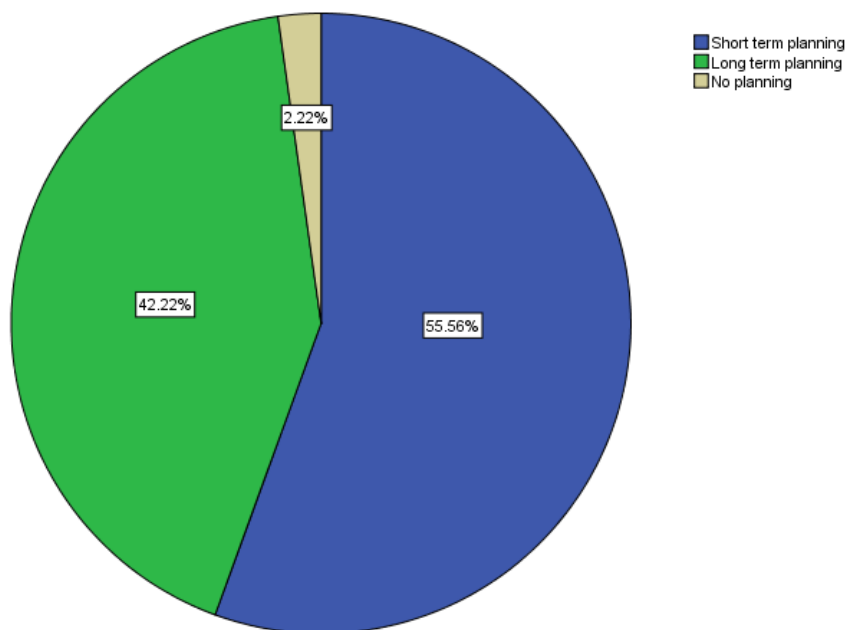
*We get to see it ourselves, sometimes there was a TNB van that came and fixed the electrical fault. Sometimes, the technician who is most frequently called is Mr. Cole. He is very loyal and easy to work with. He is fast in carrying out the duties assigned to him. He doesn’t drag it for a long time.*

Her friend Calvin (S06) also agreed with her, saying that ‘*we got the perception like that from the example like if there is any fault or damage, it is fixed in a short period of time, [and] even sometimes we found out that it was fixed before the report or complaint was submitted*’.

From the dialogues above, such perception of the school utmost concern and priority of maintenance was perhaps derived firstly from the response time of repair and maintenance carried out. These works that were performed

immediately gave an impression of how much the school ‘care’. Another possible factor is the students’ own visual confirmation of the maintenance activities carried out by the assigned personnel (Mr. Cole) or the authority (TNB – electricity service provider) - who was seen by the students as always being on the job, in carrying out the maintenance works in the school.

It is also interesting to note that the students’ responses to the interview questions seems to further support the notion that the students are aware of their school surroundings and do notice what is going on in their school. Such evidence seems to suggest that students are not merely passive end users, but in fact, active observers in this case. In some cases, they were active participants, as some examples in section 4.5.5.1 and 4.5.5.5 will demonstrate.



*Figure 4-9: Maintenance planning primary purpose*

With regards to maintenance planning primary purpose, Figure 4-9 shows that the majority (56%) felt that it is more to short-term planning while 42% perceived it to be of use for long-term planning. A small number of respondents felt that the school has no planning at all with regards to its building maintenance. Such perception is perhaps attributed to some respondents who were not involved with school maintenance matters and therefore lacks the necessary information.

Nevertheless, as officer James (A1) pointed out, maintenance planning is undertaken annually, *‘where the discussion with SED is organised on a scheduled basis’*. He further explained that *‘the SED would organise a meeting with all the DEO under their respective state, and the DEO would later have a meeting with the schools under their supervision’*. Officer Neil (A5) also gave similar account of the planning process, stating that they would prepare for ‘Operating Expenditure budget’ annually, which would be based on schools’ suggestion on *‘areas in which maintenance are needed, apart from the designated maintenance outlined by the Division’*. Usually maintenance planning is focused on minor maintenance which is mostly repair in nature, according to officer Larry (A3).

At the school level, principal Dominic (S07) explained that they have short-term planning which is *‘more related to critical maintenance issues in school’* while the long-term plan is *‘more towards adding and upgrading of the existing school facilities for the needs of our students and teachers’*. Similarly as disclosed by Larry (A3) at the agency level, the long-term maintenance planning involved more upgrading and refurbishment, replacement and is also larger in scale’, usually electrical rewiring.

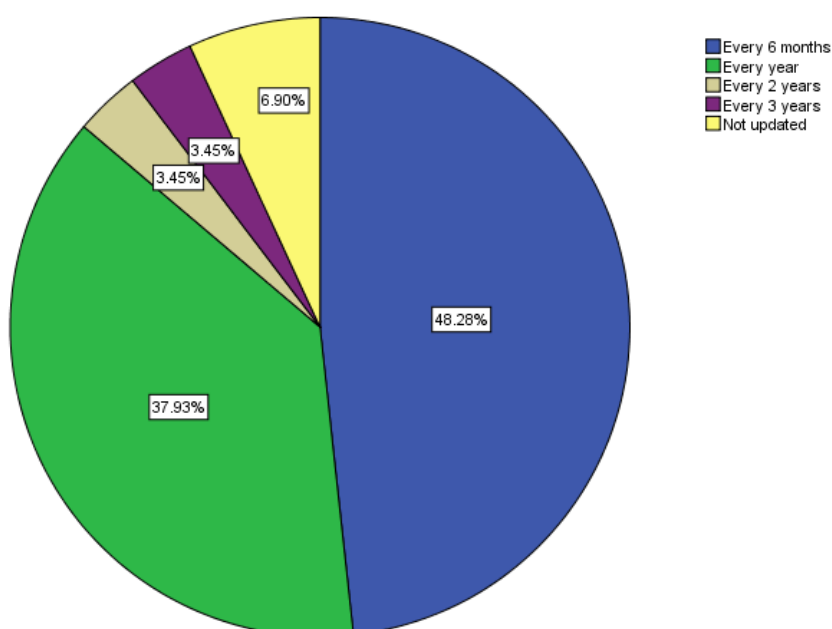


Figure 4-10: Frequency of maintenance update

The survey (Figure 4-10) revealed that the majority of the respondents are of the opinion that maintenance planning is often updated, namely every 6 months in a year. A substantial minority (37%) agreed that it is updated every year.

Earlier explanations from officer James (A1) and principal Dominic (S07) seem to corroborate these findings, as short-term maintenance planning appears to be more dominant as earlier illustrated in Figure 4-9.

#### 4.5.3 Type of maintenance

As shown in Figure 4-11, the majority of respondents (78%) felt that a reactive type of maintenance is more dominant in their respective schools. Meanwhile, another 19% noted that their respective school were more proactive. Only a small percentage of 3% considered no action was taken.

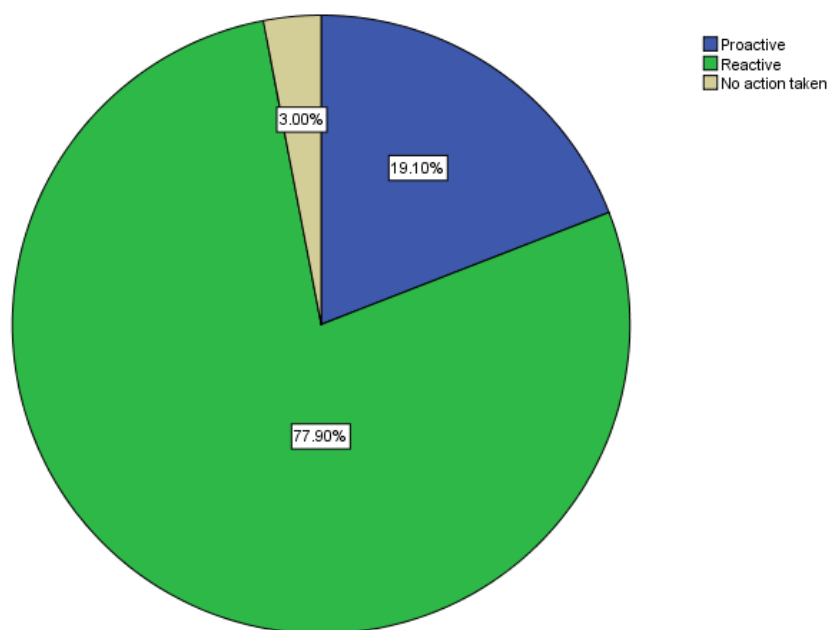


Figure 4-11: Type of maintenance in schools

Respondent	Proactive		Reactive		No action taken	
	No.	%	No.	%	No.	%
Officers	2	18.2	9	81.8	0	-
Principals	11	61.1	7	38.9	0	-
Teachers	52	28.9	127	70.6	1	0.5
Students	75	14.3	428	81.7	21	4.0

Table 4-31: Type of maintenance in schools (Respondent type)

Further analysis of respondents in Table 4-31 revealed that such perception is true for all, with the exception of the principals, most of whom believed that maintenance is more proactive. Being the teacher in charge of school physical

condition, teacher Callahan (S06) was one who agreed that in his school at least, maintenance was proactive:

*What we practiced here is more proactive because we would try to identify any problems that could happen, we would try to fix it before it become bigger. And sometimes, the damage would appear suddenly. That means we are reactive right? So it is a combination. And also preventive too. For instance, like termites, we would take a follow up action like pest control and for the wooden parts, we replaced them with aluminium or steel. We did it for the quarters and when we have a budget to do it, we would change in the specification.*

Nevertheless, his school principal, Cameron (S06) seemed to take the middle ground on the matter:

*Sometimes it is a mix of both - pro-active and reactive. For instance, for air conditioner, we will look at the service schedule. Sometimes, suddenly it happened, then maintenance is reactive.*

In sum, what the above mentioned quotes alluded to were that both reactive and proactive maintenance were being carried out. But in the former, reactive maintenance appears to be perceived as being more dominant.

#### **4.5.4 Maintenance organisation**

At the school level, the interviews and documents review revealed that all schools, regardless of types, have established a specific committee as the key organisational structure in dealing with school building maintenance matters. The most typical is the School Safety, Health and Beautification Committee or 3K committee (*Keselamatan, Kesehatan dan Keceriaan*) which is the main organisation entrusted with ensuring that the overall school physical facilities and compound are safe, healthy and beautiful as demonstrated in Appendix 20A. In addition, some schools have established other committees like Asset/Building Committee which was entrusted to look after the school physical building and facilities with duties as mentioned in Appendix 20B.

The possible reason why the 3K committee is commonly found in all schools is because it is a MOEM-led nationwide initiative. As earlier mentioned in section 4.5.1, this was after all the overarching policy, which indirectly incorporated maintenance. This special committee, is generally led by the school principal, and comprised of senior assistants, head of departments, teachers and support staffs. The support staff could include chief clerk, lab assistants as well as hostel wardens and hostel supervisors where applicable. Typically one committee member, usually a teacher or support staff, is appointed to be the person in charge of one special room or block in the school. In terms of its administration, the committee is customarily under the direct supervision of the Senior Assistant in charge of Student Affairs.

In terms of specific personnel available for school building maintenance, only the fully residential and technical/vocational schools have such additional resource, with a technician and two assistant engineers (civil and electrical) respectively with duties as stated in Appendix 20C. These are perhaps due to their school type, which typically have student hostels. With the recent reorganisation and status upgrade of the technical/vocational schools to a college, one specific unit, namely the Development and Maintenance Unit was established.

Interviews with education officers from various agencies indicated that there is specific unit in their respective organisation which is in charge of the school physical infrastructure matters, including maintenance. The typical unit is called 'Development Unit' like in agency A2 and A4. Officer Kenny (A2) also disclosed that *'we have fully qualified technicians both at the state as well as DEO level'*. He further explained that *'at the DEO level, it is similar to the state level, but they are the organisations that supervise the schools directly'*. He added that *'all the information submitted to us by the DEO would be forwarded to the Ministry for follow up action'*. According to officer Neil (A5), the Asset and Facilities Unit are in charge of maintenance, with the additional external support in the form of Equipment Maintenance Unit, established in four zones (Northern, Middle, Eastern and, Sabah and Sarawak). These EMCs function like DOE, by providing advice and consultation and monitoring for minor school building maintenance, although their primary responsibilities are *'to carry out maintenance and repair of certain machines or equipment in the workshop'*.

#### **4.5.5 Maintenance processes and procedures**

The most typical workflow of the main processes and procedures of school building maintenance were presented in Appendix 25(A and B), which was synthesised from the interview data. As shown in Appendix 25A, in fully residential and technical/vocational schools where technician or assistant engineer is available, the maintenance activity would be made much easier as there is a dedicated in-house technical expert. In contrast, where there is no such personnel in national secondary and religious schools, the responsibility are commonly assigned to a teacher, as illustrated in Appendix 25B.

Despite the slight noticeable difference primarily associated with the type of schools, which entails the availability of technical personnel, similar workflow practice was evident in all schools. It is these main processes and procedures that are examined in greater detail in the following sub-sections.

##### **4.5.5.1 Primary impetus for maintenance**

The survey outcome (Figure 4-12) showed that the primary impetus of complaints were teachers. This was because, apart from teachers themselves who made the complaints personally, the students interviewed in most schools frequently mentioned that they usually inform their teachers if there was any maintenance issue. Others directly made the complaint themselves by filling in the complaint form (Appendix 22) or writing in the complaint book. Some informed their parents who submitted their concern via Parent Teacher Association or to schools, according to teacher Callahan (S06).

In some cases, the principals are the main impetus for the maintenance activities carried out in their respective schools. A prime example was principal Irene (S05) who disclosed the maintenance projects conducted at the current and previous schools under her care:

*For the painting of the prayer building, I prepared a proposal paper. We got that from the State Tithe Board ... They repaired the toilets, replaced the damaged ceiling and the ceiling wood frame. They painted it inside and out...Before I came here, I have done it in my previous school. I requested for tiling and carpet installation in my former school.*

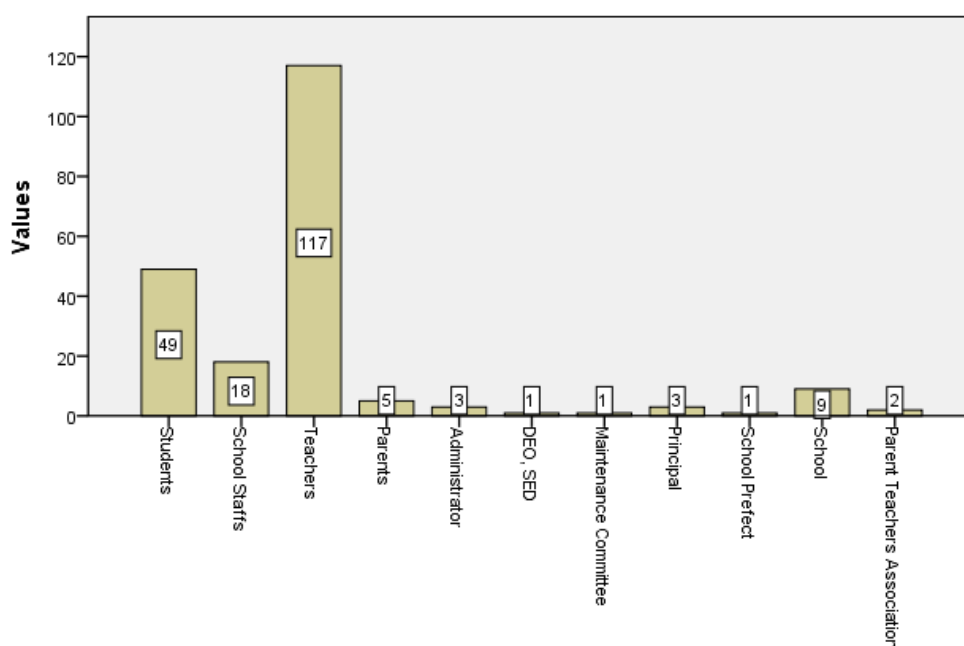


Figure 4-12: Primary impetus of maintenance

Irene took her responsibility as a principal very seriously and justified her actions as follows:

*Apart from that, the feeling of responsibility. When we see our teachers and students not comfortable, we want to make them feel comfortable, to be able learn, so everything comes from the heart. So we find the money, we will make an effort. We can't just let it be. Responsibility, isn't it?*

However, probed further by the researcher, there was perhaps an undercurrent of deep spiritual awareness attached to that 'responsibility' which sustained her passion to do what principal Irene does for the school under her care:

*This is the way I see it. When we do something, first and foremost, we must be sincere. It is our responsibility. When we do good things, the good things would come back to us. And the goodness that are given by God is not only for us, but for our family and our children. God's blessing cannot be seen, but we can feel it, right? It could not be seen but is felt, from which it evokes the feeling of calmness.*



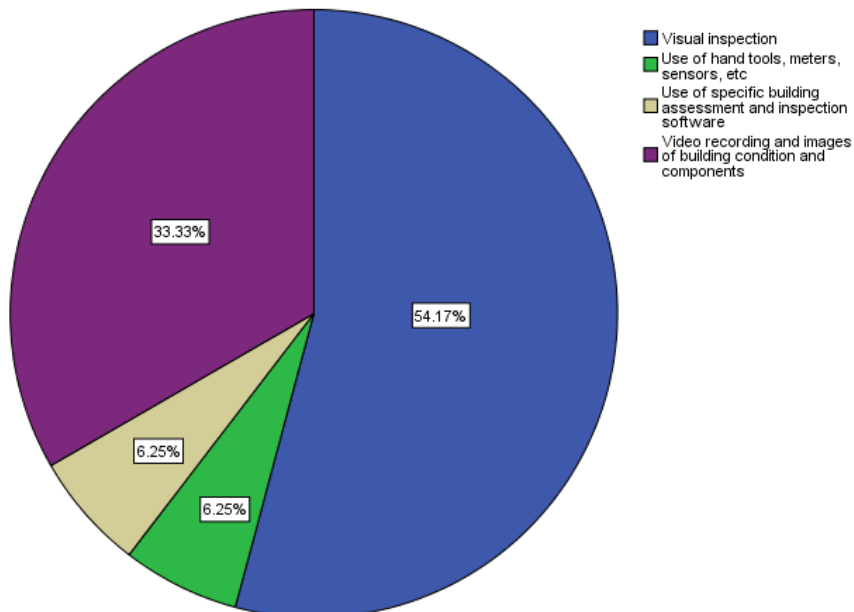
Principal Irene further divulged her personal interest in maintenance enthusiastically during the interview by recounting the various maintenance projects she did at her own home:

*Firstly, I am interested in this type of things... Yes, interest and experience, we surveyed around. We have to know these things... For me, we need to know these things because if we don't, we have to rely on other people to come, contractor to do it, so the cost is huge.*

In sum, the findings pointed to the primary impetus of maintenance, who could be any stakeholders, both internal and external. The initial process could perhaps be in the form of complaint, which was relayed directly to the school via a set of established process and procedures, usually by completing a complaint form or writing it in a complaint record book. Alternatively, some students choose to inform their teacher or parents. More interestingly perhaps is the fact that some principals like Irene (S05) take it upon themselves to be the impetus. One could perhaps conclude that these findings indicated to a certain extent the important role of each stakeholders in maintenance, an aspect which will be addressed in section 4.6.4 within this chapter and discussed at length in section 5.2.5 in the next chapter.

#### *4.5.5.2 Evaluation of school building condition*

The study also examined the evaluation aspect of school building condition, which includes the evaluation represented by complaints or its follow up evaluation as verification process of the initial complaint. This includes evaluation methods, frequency, recording method, storage, and usage, all of which are discussed in the following paragraphs.



*Figure 4-13: Evaluation method of school building condition*

Firstly, the survey result (Figure 4-13) revealed that the two most common evaluation method of school building condition involved personal visual inspection and photo images of the building condition. This is substantiated by both the observation notes and interview, many of whom cited the process of making complaints and submission of maintenance request to the authorities (DEO, SED, MOEM) which typically encompass personal visual inspection of the site and taking visual evidence in the form of photos. As remarked by officer Neil (A5) *'we placed the responsibility to the school to visually check the building condition'*.

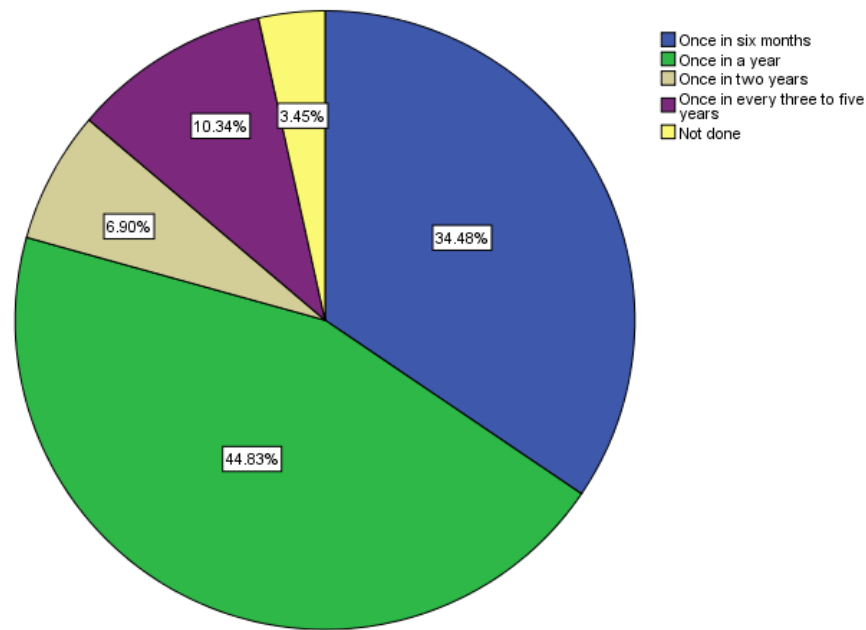
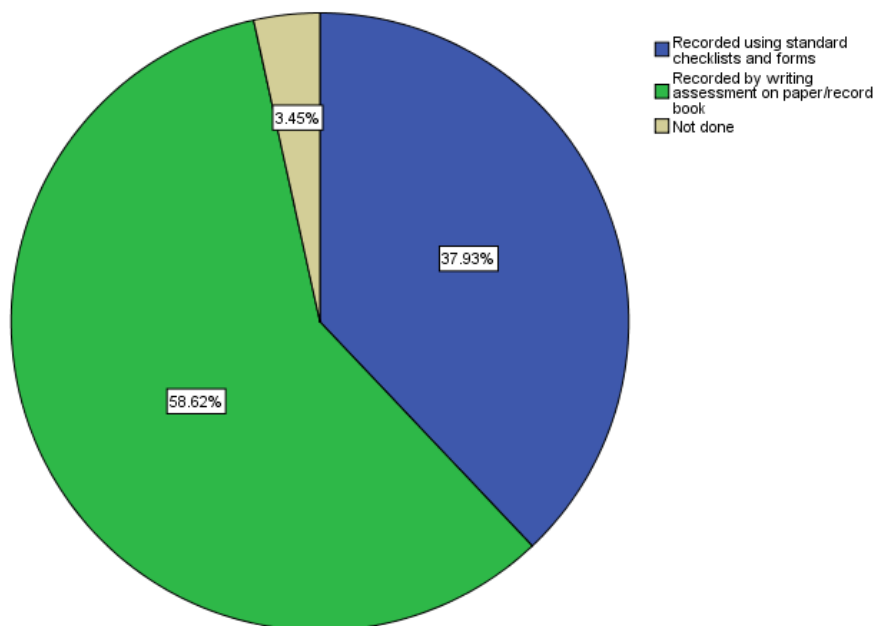


Figure 4-14: Frequency of evaluation of school building condition

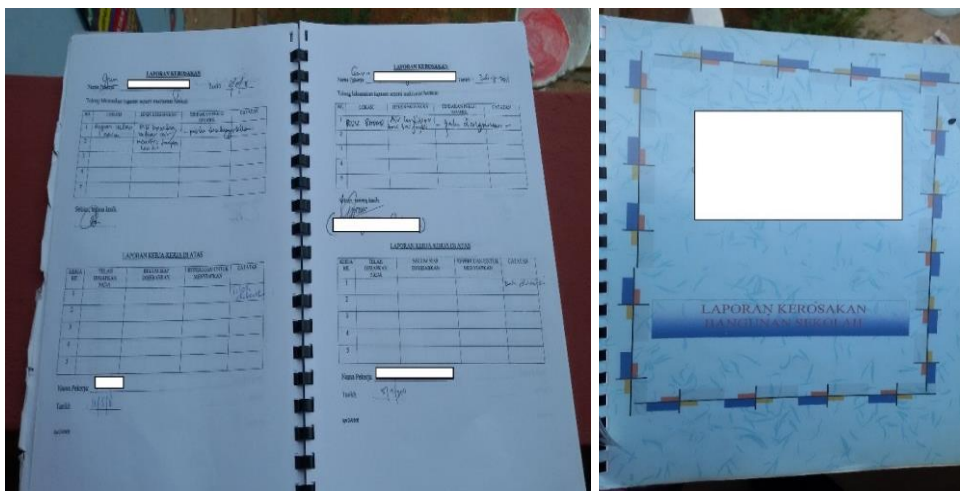
Secondly, in terms of frequency of evaluation, the findings of the survey (Figure 4-14) revealed that the majority (44.8%) felt that it is done once a year. This is exemplified by principal Harrison (S16) who clarified that *‘we would submit report [including evaluation] every end of the year’*. Another 34.4% respondents felt that the evaluation of the school building is carried out once in six months. Based on the interview data, perhaps a more fitting description for this group is that the monitoring cum evaluation of the school premises is carried out continuously. As revealed by principal Felicia (S10), *‘we know that the school building is getting older [and] that is why we need to be vigilant, alert and always monitor the school physical condition especially from the aspect of electrical wiring, drainage, toilets and others’*.

Further interviews disclosed that the majority of the school principals like Cameron (S06) tend to go around the schools as a normal daily ritual to inspect current condition of their school buildings, among other things. As described by teacher Benjamin (S03), his principal *‘would find the [maintenance] issue himself’* by wandering around the school compound along with the technician to inspect and evaluate the school building condition.



*Figure 4-15: Method of recording evaluation of school building condition*

Fourthly, findings in Figure 4-15 suggested that the evaluation of the school building condition appears to be mainly recorded (59%) by writing assessment on paper or record book. Documents reviews conducted appears to validate this method as shown by Photo 4-45. In some schools, a standard form similar to Appendix 22 is used which is later filed accordingly under school building maintenance No.200-6/1/1 (Photo 4-46).



*Photo 4-45: Maintenance record book (S07)*

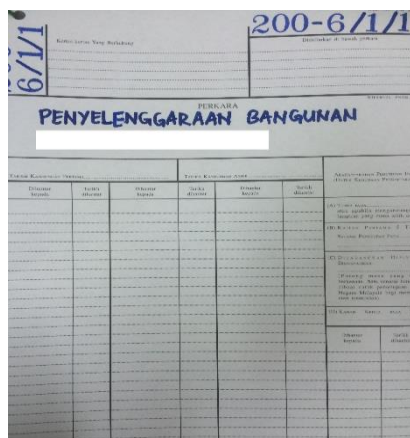


Photo 4-46: Sample of school building maintenance file (S10)

Fifthly, the survey (Figure 4-16) showed that the majority (55%) of the school building data report are mostly in paper form, which are kept typically in files as shown in Photo 4-46. In addition, 41% respondents indicated that the data was stored in computer. Interviews with officer James (A1) revealed that the status of the building condition was also recorded online in Ministry's Education Management Information System (EMIS) by each school. He explained that via EMIS, *'information about the condition of certain buildings which need immediate maintenance [are recorded] using 4 specific categories like 'major damage', 'moderate damage', 'minor damage' or good condition'*

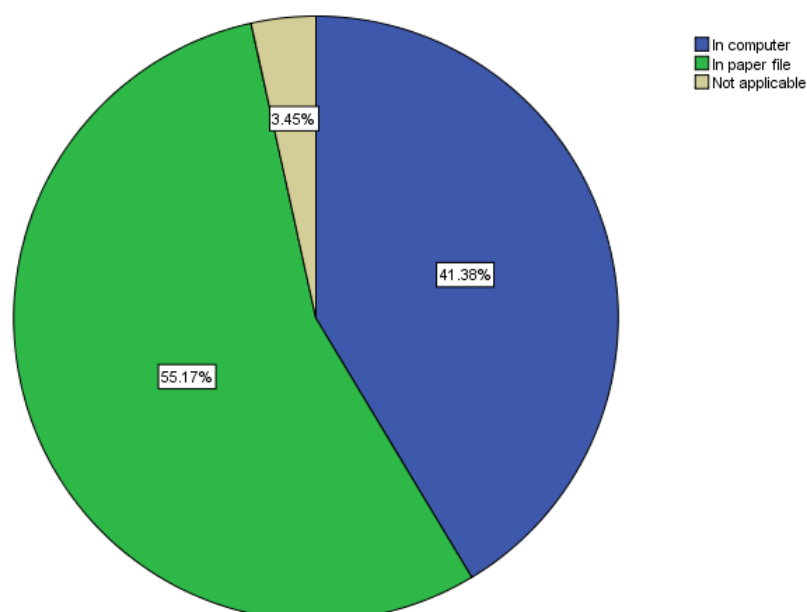


Figure 4-16: Storage method of evaluation data of school building condition

Lastly, the survey findings in Figure 4-17 disclosed that the evaluation of the school building condition were used for various purposes. This includes for both short-term (28%) and long-term (21%) maintenance planning. Others felt that the evaluation data is used for routine operation and maintenance (27%) and preventative maintenance (18%). Only a small percentage thought it was used as a benchmark for measuring the component life expectancy. Interview data suggests that all the aforementioned purposes were valid. Principal Cameron (S06) for instance, complaints records from students, staff and teachers were used for maintenance planning purposes, both short and long- term. Depending on the evaluation of the severity of the maintenance issue, the data would provide a basis for follow up maintenance actions deemed necessary. As alluded to by officer James (A1), *'the Ministry would monitor using these data from EMIS for immediate action and as the basis for planning in requesting maintenance allocations annually'*.

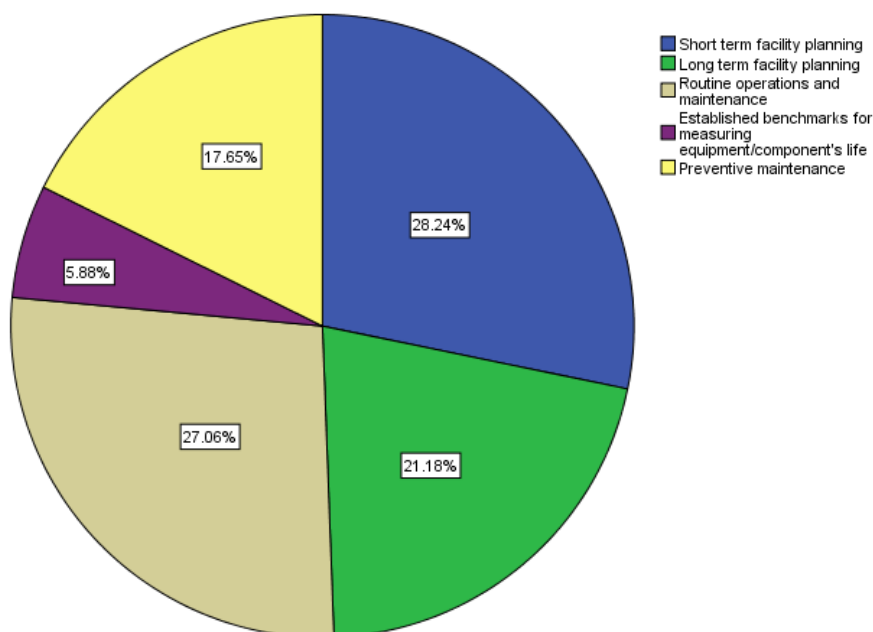


Figure 4-17: Usage of evaluation of school building condition

In sum, many of the findings suggest that evaluation is another important part of the maintenance process and procedure. It was mostly carried out through visual inspection, with images of maintenance issue also taken. Majority evaluation was performed within the range of six to one year, and is recorded by writing assessment on paper or recorded in a book, and in computer via the

online EMIS programme. These data were then used for mixed purposes, ranging from maintenance planning, to implementing routine and preventative maintenance. This brings forth the next process of maintenance, namely prioritisation.

#### 4.5.5.3 *Maintenance prioritisation*

Another maintenance process and procedure that was discovered was maintenance prioritisation. This process is perhaps necessary due to the challenge of limited funds as later elaborated in section 4.6.2.2. As officer Kenny (A2) argued *'the maintenance needs to be structured and prioritised'*, an opinion shared with officer Larry (A3) and principal Cameron (S06). The interviews also indicated there was a common pattern in terms of prioritisation, which was encapsulated by teacher Callahan, who was the teacher in charge in school S06:

*We carried out the works that we have enough budget for. We have to do it based on priorities. We emphasized more safety than students' comfort. The cheerfulness is much later.*

Callahan's quote managed to capture the essence of prioritisation basis taken by most school administration. Principal Dominic (S07) appeared to subscribe identical scheme, as he stated *'for me the condition of safety is important'*. He added that *'if it could threaten the safety of the students and school community, [then] that is a priority'*. Officer James (A1) also shared Dominic's opinion stating that *'the main criteria of consideration is firstly safety'*. James offered the ministry's overall perspective on the issue of safety, by emphasising that *'this safety aspect is very important because it is the primary objective of the Ministry to ensure that all school members are in a safe environment and able to carry out good teaching and learning in a conducive school environment, thus producing excellence in human capital development in future.'* James (A1) elaborated further on the underlying reason of the ministry in placing safety as their top priority in relation to the physical condition of the school building and the learning context:

*The physical condition of school is very important because it gives confidence to teachers and students in carrying out the teaching and learning process as well as human capital*

*development in the school. If it is not safe, it would expose the students and teachers to the feeling of fear, which consequently affects negatively on the students' knowledge attainment and character development. Therefore, we really need a school or educational institution which is safe for all staff members, teachers and students.*

It is interesting to note that James's opinion on the matter was identical to principal Dominic's (S07) concept as the following excerpt of the interview demonstrated:

*The condition [of school building] is important. It also must appear safe. When it is safe, the confidence and comfort for the teaching and learning process would be carried out smoothly, and this would not disrupt the teachers and students' concentration.*

In sum, the above mentioned findings do not mean that safety is overly emphasised at the expense of comfort and aesthetics. It just demonstrated that for practical and budget reasons, such prioritisation system is in place as a basic guideline in managing maintenance issue. As earlier alluded to by Callahan (S06), safety is the first criteria, but comfort and aesthetic were other important criteria too. The walk-through observation of the schools appears to give credence that equal importance was placed on comfort and appearance as noted earlier in section 4.3.2 and 4.3.3 respectively. The evidence of 3K policy as earlier mentioned in section 4.5.1 also is another supporting evidence that this is the case.

#### *4.5.5.4 Additional maintenance fund request*

In terms of additional maintenance fund for schools, officer James (A1) stated that the Ministry '*have instructed the officers in schools and DEO to submit via the proper channel if there is a need for school maintenance, so the school and the school administrators need to know the proper procedure on how to maintain a school building when damages occur*'. He clarified that if there is such a need, the schools are required to submit their requests to the DEO immediately, which would forward them in a form of an additional budget request to the SED to be able to carry out the maintenance. This is usually for



emergency cases like roof or other urgent maintenance needs, although other maintenance needs are entertained on a case by case basis subject to availability of funds. As principal Cameron (S06) remarked, if there is no available school allocation, *'we have to submit a request for allocations from the Ministry, SED or DEO'*. The education officers would then inspect the site to verify the request and maintenance issue. If there are available maintenance funds at the agency level, the money would be given through financial warrant to the school. However, if no funds are available, the request would be forwarded to the finance department. Subject to availability of budget, the finance department would disburse the money to the requesting agency that would later allocate them in the form of warrants to schools to undertake the next process, which are elaborated in the following section.

#### *4.5.5.5 Maintenance implementation*

In terms of the implementation of maintenance in the schools, there were many projects that have been carried out in the schools visited as shown in Appendix 21 based on evidence from the perusal of school records and interviews. According to the records, sizeable maintenance projects were typically funded by the federal government, although in some cases, they were funded by the school PTA, alumni and other external sources. Initial data from records and interview were further corroborated by the photo evidences gathered via the school walk-throughs with examples of various completed maintenance projects like electrical and roofing (Photo 4-47), as well as toilets and paint work (Photo 4-48).



*Photo 4-47: Completed maintenance project: New electrical power distribution box in S18 (left) and roof replacement in S03 (right)*



*Photo 4-48: Completed maintenance project: Toilets in S07 (left) and new paint work in S01 (right)*

During the school visits, some maintenance projects were in progress as shown in Photo 4-49 and Photo 4-50. To a certain degree, these indicated that school building maintenance is a '*continuous programme*' and works are '*carried out from time to time*', as alluded to by officer James (A1).



*Photo 4-49: Maintenance project in progress in S11: Flooring (left) and door frame (right)*



*Photo 4-50: Maintenance project in progress in S11: Awning replacement (left) and grill repainting (right)*

With regards to how the school maintenance works were undertaken, the survey findings in Figure 4-18 showed that they were mostly carried out by external contractors, as exemplified by Photo 4-49 and Photo 4-50 in the previous section. The result also indicated that other internal stakeholders like school technician/assistant engineers, school staff, teachers and even students, in addition to others, also performed the necessary maintenance works.

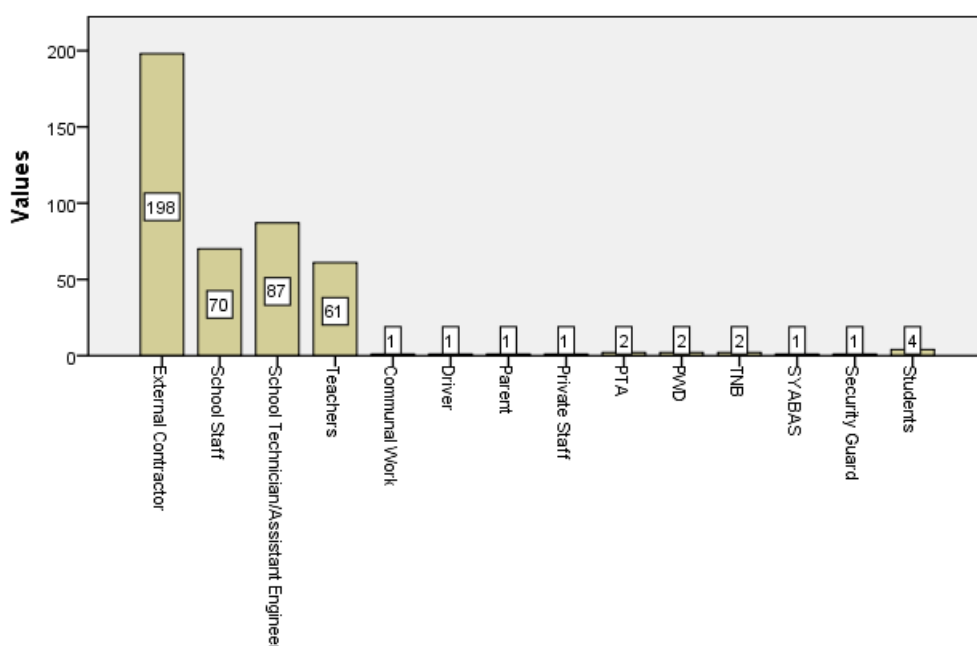


Figure 4-18: Maintenance implementation

However, interviews suggested that different approaches were taken by the school leaders depending on the nature and type of maintenance, and availability of resources like personnel and finance. As described by principal Cameron (S06), for major maintenance work like building structure, *‘the works are carried out by external contractors’* and the in-house technical personnel *‘is more of an advisor’*. Nonetheless, *‘for minor works like broken pipes and small electrical jobs, he will do it himself’*. Cameron’s statement was corroborated by his teacher, Callahan (S06), who added that *‘if is a major issue and the cost is high, we would engage an external contractor’*.

These different implementation approaches of maintenance had not gone unnoticed by one of their students, Chris (S06) as he explained below:

*From what I noticed, our school technician, Mr. Cole. If there is minor maintenance, he is the one who will fix it. If there is like water issue that he was unable to fix, an outsider is called for example SYABAS [water utility service provider]. If it involves electricity then TNB [electricity service provider] is called (Chris, S06 student).*

Apart from the involvement of external contractor or in-house technical personnel, there was also active involvement of staff members in school building maintenance, either voluntarily or by appointments in some schools as the following cases demonstrated.

In school S01, teacher Abraham said that for some minor maintenance like bulb changing, some of the teachers carried out the work themselves voluntarily in their school. He explained that this is because *‘to make a report to the authorities would take a long time and go through a lot of bureaucracy’*.

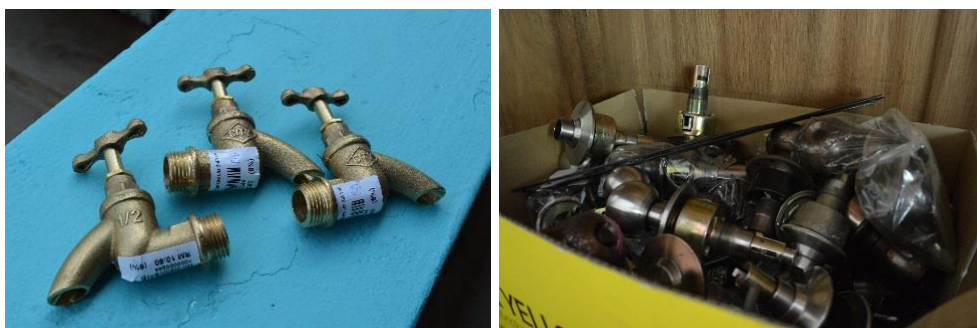
However, for most schools which do not have a dedicated technical personnel, usually a teacher would be appointed by the school management as the main person in charge of the school physical development and maintenance management, although they are not expected to do the maintenance work themselves. Desmond (S07), one of the teachers who was appointed to such position suggested that *‘somebody else with the proper expertise’* should be in the position instead of teachers. This is because the teachers have their core responsibilities and maintenance is not *‘our expertise’*.

In another school (S05), its principal Irene is aware of such a predicament as *‘they [teachers] would not be able to cope, with teaching and all’*. Hence, she opted to handle school maintenance matters rather differently. Leading by example, she got personally involved and leveraged on her other staff members to undertake several maintenance works through *‘a communal effort’* during the school holidays like painting the school walls and buildings (Photo 4-51).



*Photo 4-51: Maintenance via communal efforts by repainting school wall (left) and guard post in S05 (right)*

In another school (S14), one of the support staff, the school driver Gordon, was assigned as informal in-house handyman to perform minor maintenance and repair work like the replacements of lighting bulb, water tap, ceiling fan or door knob when required. The materials used were usually new stock or sometimes reusable parts recovered from previous maintenance work (Photo 4-52). According to principal Gabriella (S14), this is *'a way of cost cutting measures'* but *'if he cannot do it, then we have to call the external contractor'*.



*Photo 4-52: New water taps (left) and recycled door knobs used in S14 (right)*

Besides school staff members, the study findings suggest that there was also some supervised active involvement of students in maintenance in a few schools. Two such examples were the maintenance of plumbing and school air-conditioners units in two schools (S09 and S16) respectively. However, it must be said that such involvement is linked to the maintenance-related courses offered in their schools, namely Domestic Plumbing (S09) and Refrigeration and Air Conditioning Technology (S16).



According to principal Elizabeth (S09), *'because we have vocational students [Domestic Plumbing], if it is plumbing issue, we could rely on them' and 'we can ask for their help.'* She explained that the school would *'buy the materials'* and she would usually *'contact the teacher, explain why I need it, then the teacher would get the boys together [and] he would do it with the students'*.

Meanwhile, senior assistant Harrison (S16), clarified that *'the students of this course [Refrigeration and Air Conditioning Technology] really help us because sometimes they carry out air-conditioning [scheduled] maintenance for the air-conditioning units in this school'*. He said that *'the teachers have already organised several groups of students who carry out their practical session by assisting in maintaining the air-conditioning units'* as demonstrated by Photo 4-53. These students *'do not only service but also replace the parts like compressor, fans and capacitor, where necessary'*.



*Photo 4-53: Wall mounted (left) and under ceiling air-conditioner units in S16 (right)*

Both schools (S09 and S16), which offered the relevant courses respectively, took the view that these activities are very valuable as a means of practical hands-on exercises for the students, as part of their required on the job training. When asked about such creative alternative maintenance approach taken by the school, the respective principals, teachers and students had positive things to say. Principal Elizabeth (S09) *'see many benefits'* with such approach:

*If we have any plumbing problems we are relieved to have them. We would see plumbing issues as easily resolved. We would refer to them. The teacher would teach them how to do it. They gained experience. We know that we have a strong*

*resource here. Yes, we do see it as an element of strength. More vocational subjects, than it would be more beneficial for the school building, like air-conditioning.*

Senior assistant Harrison (S16) also agreed with Elizabeth's opinion, adding that *'with their [students'] assistance, our cost could be brought to a minimum a lot'*. Similarly, he believed that *'such [vocational] courses like these helps a lot'*.

The students involved in the initiative also shared the same opinions on the matter. They believed that the maintenance task enabled them to apply what were learnt in the workshop in real life problems. They also felt really good to be able to contribute to the betterment of the school environment.

Meanwhile, alternative approach to maintenance implementation was noticeable in one school (S07). Principal Dominic (S07) was enthusiastic to share his success of dealing with maintenance needs by adopting such approach, namely through the parent's engagement toolkit programme prescribed by MOEM:

*When we implemented the parents' engagement toolkit programme, we can see that it has contributed a lot in terms of school maintenance, especially the classrooms thus far... to fix the classrooms, by painting the classroom, fixing the floor, replacing and adding more fans, and providing other things as well that you can see yourself... So we use this channel to assist us in these matters and it has been quite successfully implemented.*

The visual observation in his several classrooms in his school as shown in Photo 4-54 illustrates what principal Dominic (S07) meant by success.



*Photo 4-54: Maintenance project via parent engagement programme in classroom 1 (left) and classroom 2 in S07 (right)*

Principal Dominic even sounded positive when asked whether this would be potentially a resource that could be utilised further. As he puts it, *'I see it as a force too that could assist the school in various aspects, not only the physical aspects like making the classroom more cheerful as aforementioned, but it has assisted in the academic aspect now'*. Boosted by his initial success in improving the classroom condition, he planned to exercise similar approach in tackling the physical condition of the students' hostel as the next project. In another school (S11), a grand 'gotong royong' (communal work) day was planned by the school in the coming weekend whereby the school building would be re-painted among others.

What some of these schools have managed to demonstrate is the potential of leveraging on their stakeholders', either internal or external, as a valuable resource in assisting schools in terms of maintaining as well as enhancing the physical school environment. The maintenance works were undertaken with the spirit of communal work between the school and its stakeholders. Similarly, other schools could also follow its example and adopt the same approach for the benefits of their respective schools.

From the above mentioned findings, one could conclude that there were various approaches taken by schools in the maintenance implementation process. Perhaps it is worth deliberating which methods were more efficient and cost effective. As demonstrated by Figure 4-19, from various types of maintenance implementation approaches, the majority of the respondents chose the external contractors appointment as their preferred choice particularly in relation to the question of efficiency and cost effectiveness of such approach. Some felt that



utilising school technician or even school staff was more efficient and cost effective.

However, the matter is not clear cut. This is especially true with the successful adoption of different methods of utilising staff, students and parents by other schools as aforementioned earlier. Some of its proponents like principal Dominic (S07) felt that *'the school did not spend any money because the cost is shared by the parents of the respective classes'*. His counterpart in S14, Gabriella who utilised her handy driver felt it was *'a way of cost cutting measures'*.

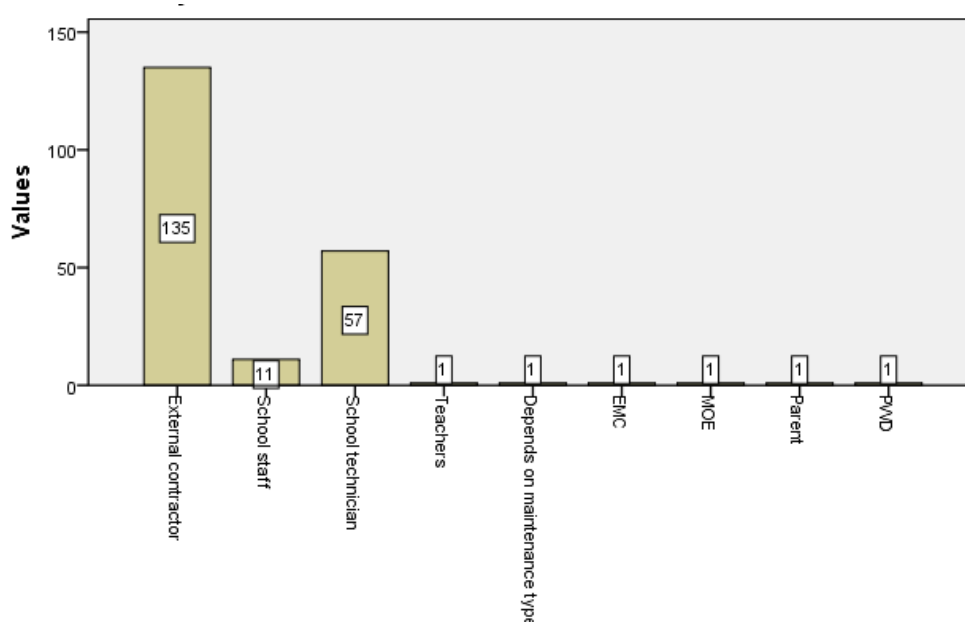


Figure 4-19: Efficiency and cost effectiveness of maintenance implementation

Principal Cameron (S06), nevertheless had a mixed response:

*Of course it would be cost effective if it is small scale jobs and the assistant engineer carried out the maintenance himself. However, if the maintenance requires higher skills and expertise, it would be much more effective if we use external contractors. From the aspect of management, it would be more effective to manage the works using internal staff than outside staff from school like SED or DEO. This is because the internal staff knows the situation better. The external officers does not know in detail about the problems.*

In contrast, officer Larry (A3), like the majority, was convinced that an external contractor is the best option:

*Financially, it is more economical to do it externally than we provide our own internal manpower. Meaning when we do it internally, we have to provide many things, for instance, starting from nails, hammer and cement. In addition, we need to manage these stocks and this would be a burden to us. Apart from that, we also need to provide the personnel. In the government employment scenario, the personnel has to be sustained through their salary and pension. These could lead to a higher financial cost in comparison to the external service option, because the use of external contractor is a one off. Anyway, the school building does not require repair all the time, sometimes one or two years, so we can make saving from that aspect. If we do it internally, we have to employ the person throughout the year.*

Officer Larry's (A3) argument supports outsourcing the maintenance work. Nonetheless, principal Gabriella (S14) was eager to draw attention to one possible drawback of engaging external contractors. Based on her own experience, 'sometimes if the job is small, they are not interested to come, so the maintenance got postponed.' Even officer Larry (A3) admitted challenges for maintenance work, especially with its progress.

*Besides that is the disorganised work progress. By this I mean the work which exceeds the target timeline. For instance, we want repairs in the classroom completed before the school terms starts. But the works were not completed as targeted and they continued after the school opened, so this disturbs the teaching and learning process. This is the challenge related to work progress. Finally it is the weather. In Malaysia what we are concerned with is the rainy season. When the maintenance activity carried out is related to drying process, like tiling works and installing building beam, which require a good hot weather.*

*When the weather interferes, then it would affect the work progress.*

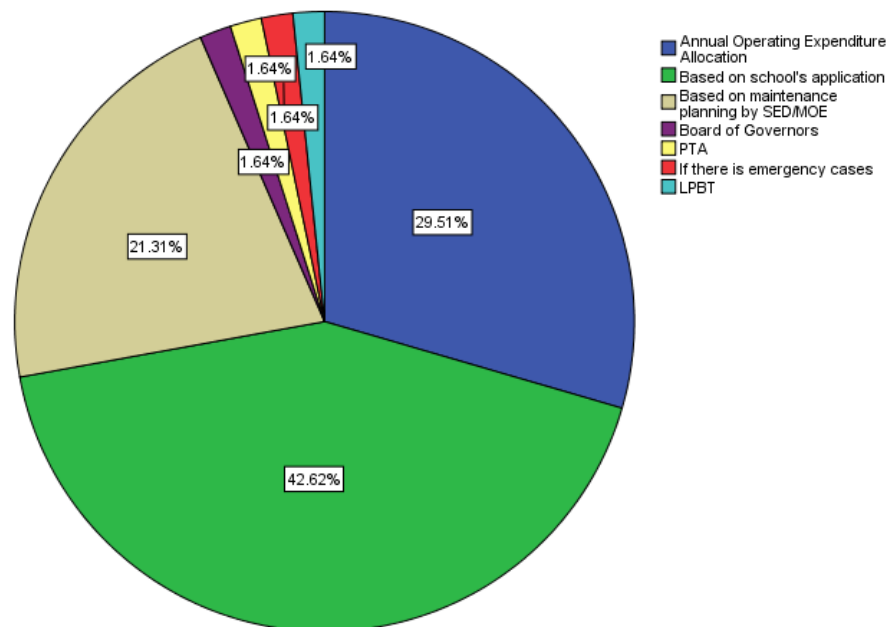
Student Amy (S01) explained her situation. She was concerned that *'there are toilets that are going to undergo some maintenance to make it better [but] unfortunately, it would cause noise pollution which makes learning difficult for us.'*

The findings suggest that schools adopted various approaches in carrying out these essential works. Major maintenance works were usually carried out by private contractors. Minor ones were undertaken by other stakeholders, spanning internal and external stakeholders where applicable.

#### **4.5.6 Maintenance resources**

Another aspect of maintenance practice which was examined is associated with its resources. In this section, the findings of two most vital maintenance resources, namely finance and personnel, are now discussed.

##### **4.5.6.1 Maintenance finance**



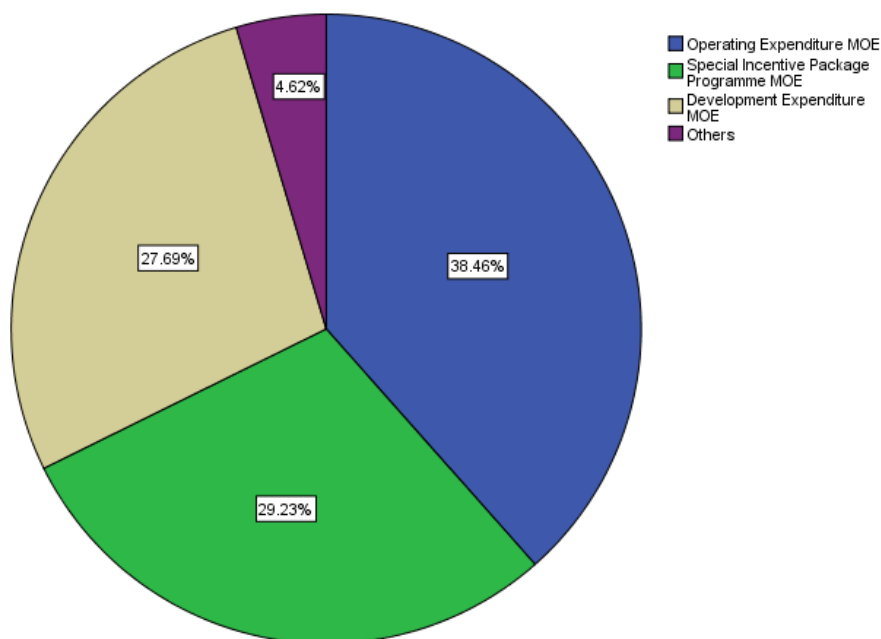
*Figure 4-20: School building maintenance financing*

Figure 4-20 shows that the majority respondents (42.6%) felt that the financing of maintenance is primarily based upon the school's application to MOEM via

the respective DEO, SED or Divisions. Apart from that, another two main sources of maintenance finance originated from the annual operating expenditure budget and based on planning by the SED or MOEM, as principal Cameron (S06) explained:

*Of course the government provide the allocations for school building maintenance through the annual operating budget and based on the school's request. There is also occasion where the Division asked us to submit our request in terms of maintenance scopes that was predetermined by them, for instance in Special Economic Stimulus package. So it is all three.*

In addition, the document reviews data of each school as shown in Appendix 21 also adds further argument to these findings.



*Figure 4-21: Maintenance budget received within last 5 years*

Figure 4-21 shows the maintenance budget that was received by the school within the last few years; the three main financial resources are the operating expenditure (38%), special incentive package program (29%) and development expenditure (27%), all of which are from MOEM. Only a small percentage of funds is from other sources. This 95% maintenance budget demonstrated the virtual dependency and reliance on the federal government funding channeled via MOEM.

Interview data seems to corroborate this finding. When asked about other forms of funds for maintenance, officer Neil (A5) stated *'none, we rely solely on the government's allocations.'* This is confirmed by officer Mark (A4) who stated that their *'allocations every year depends on the government's budget'*. This was expected as after all they both are government agencies. Similarly, as schools involved in the study were public schools, their maintenance were also primarily government-funded, as illustrated by their documents reviews results in Appendix 21. As teacher Abraham (S01) mentioned *'our school is funded by the government, therefore, all the maintenance and its expenditure would come from the Ministry'*.

#### **4.5.6.2 Maintenance personnel**

As mentioned in section 4.5.4., the interviews disclosed that the fully residential and technical/ vocational schools have dedicated technical personnel to deal with maintenance matters. In the former, a technician is on hand while in the latter, two assistant engineers (civil and electrical) are available. The duties of these dedicated technical personnel are enclosed in Appendix 20C. For the other types of schools, namely the national secondary and religious schools, there is no such technical expertise at their disposal.

#### **4.5.7 Creativity and innovation**

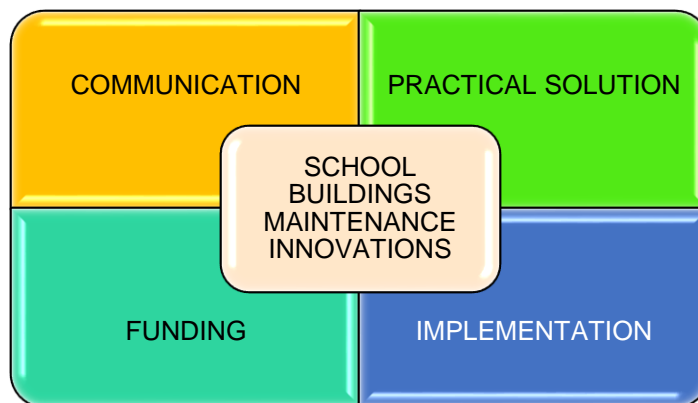
Despite the centralised nature of Malaysian educational management, creativity and innovation were observed as fairly thriving in schools. The study findings suggest that these were primarily borne out of necessity, including the limited resources as later mentioned in section 4.6.2. Most importantly however are the underlying philosophical beliefs of some school leaders to think outside the box which were perhaps the key driver of the maintenance innovations, as argued by principal Cameron (S06):

*Thinking out of the box is essential and important. We need to always think out of the box, to find ways to resolve the problem. If we keep using the same conventional method, we would face the same problem.*

Likewise, principal Irene, his counterpart in school S05, appears to subscribe to the same philosophy in addressing school building maintenance in her school:

*We must be creative. That thing is not in any circulars. It is not in any books. But human needs to think. That is what higher thinking skills are. That is why we need to think.*

It is this creativity that was manifested in these noteworthy key examples of maintenance innovations which could be categorised into four aspects as shown in Figure 4-22, namely, practical solutions, implementation methods, financial resources and communication, as the following paragraphs would elaborate.



*Figure 4-22: Maintenance innovations in schools*

Firstly, the most visible innovations discovered were in the form of several alternative long-term maintenance solutions that are not only practical, economical and effective, but most importantly suited to their respective local context as illustrated in Table 4-32. One notable example includes the use of inter-locking pavement bricks for the school assembly area to tackle long-term maintenance problem of subsidence in Cameron's school (S06). For another school (S01), metal door and window frames were put in place as replacement instead of the normal ones made of wood as a means to control termite infestation which consequently reduces the need for future maintenance. For school S03, the use of typical porcelain sink bowls were replaced with innovative permanent cement sinks design which increases their durability and reduces future maintenance. The innovative open toilet design concept adopted in school S01 offers better ventilation, natural lighting and enables better student supervision, reducing potential abuse and misuse of the facility, again minimising further maintenance. For school S14, recycling of several items like

fans and door knobs was practiced in their maintenance work, which offers the potential of reduction of cost and better sustainability.

No.	School	Maintenance issue	Innovative solution	Photo/Evidence
1.	S06	Subsidence	Inter-locked brick	
2.	S01	Pest (Termite)	Metal door and window frame	
3.	S03	Toilet (Durability)	Permanent cement sink	
4.	S01	Toilet (Ventilation)	Open toilet concept	
5.	S14	Fans/Door knobs	Recycling	

*Table 4-32: Innovative solutions in school building maintenance*

In addition, innovation was also evident in terms of school building maintenance implementation method. In some schools, organised communal efforts through an official engagement programme involved active participation of the school internal community members or other external stakeholders as previously mentioned in section 4.5.5.5. For instance, under MOEM-led parent

engagement toolkit programme, the students' parents of S05 and S07 schools were both involved in a communal effort. For two schools (S09 and S16) in particular, students themselves are valuable partners in carrying out some aspect of school building maintenance. Meanwhile, other schools leveraged on existing staff members individually (S14) or collectively (S05) for the same purpose.

Besides that, some schools appeared to be successful in finding innovative source of maintenance funding, as observed in S03 and S05 are detailed in the later section 4.6.2.2. These were in the form of donations in material or monetary terms, and at times fully sponsored projects by individuals or organisations, both from public or private sector, all which offer additional options for maintenance funding. For more established schools, their alumni was also a viable option.

Lastly, the innovation is in the adoption of technology in terms of school building maintenance management which is evident in school S03. In this case, the Telegram social media apps was utilised by the school as an effective means of open communication platform alternative in submitting maintenance reports and follow up actions. When questioned as to the rationales for its use in the school building maintenance context, the principal (S03) cited fast, convenient, media-rich and recordable features of the social media apps as among his main arguments for doing so. He also acknowledged that not all people have the time to fill up the official form, which could delay the relaying of critical maintenance issues to his attention, especially when he is away from school. Thus, the application of the technology paves the way for a more open communication between him as the principal and his subordinates as every teacher would also be made aware of any maintenance issue and most importantly, the follow up action being taken by the school administrators to address the issue – a notion acknowledged by one of his subordinate. A subsequent interview with one teacher appeared to indicate that such an approach introduced by principal Benedict (S03) was well received by the school community as a welcome sign of increased level of transparency and accountability shown by the key actors of school building maintenance. Such transparency and accountability bode well for the school community's confidence as the school administrators are not only



acknowledging there is a maintenance issue but seen to be handling the matter immediately by his actions though his directives to the technician.

The study findings suggest it is the surrounding context of resource constraints that necessitates the above mentioned innovations. Evidence also suggest that the personal agency and leadership provided by the school principals like Benedict (S03) and Irene (S05) were also important. What is perhaps more interesting is to note another equally essential component which is the collaborative nature of these school building maintenance innovations, without which these innovations would perhaps remain in theory but not in practice.

#### **4.5.8 Key findings**

The key findings for this section are as follow:

<b>Maintenance planning is predominantly short-term.</b>
<b>Maintenance innovations are evident and important in schools.</b>

#### **4.6 Key challenges of maintenance**

The findings of the study seems to allude to several challenges being faced by schools with regards to school building maintenance. The following sections do not intend to comprehensively list all the trials and tribulations associated with such a task due to the limited space for discussion in this study. However, they present several key challenges that are commonly shared between the 18 schools involved in the current study, based on the interview data which specifically ask for respondents to state the challenges, in combination with other data acquired from open-ended survey and walk-through observations. These four key challenges which are discussed in the following sub-sections are: a) causes of maintenance issues; b) resources; c) administrators' information, knowledge and experience; and d) stakeholders' engagement.

#### **4.6.1 Causes of maintenance issues**

Based on the walk-through observation of the school compounds during the school visit as well as interviews with the respondents in the 18 schools, it was also established that there are two major causes of maintenance, nature and man-made.

##### **4.6.1.1 Human**

In terms of human causes, the quality of initial construction and material play an important part as one possible cause of maintenance. As pointed out by principal Gabriella (S14), there was a problem with the leaking plumbing in her new school building. She was unsure whether such an issue was caused by either the quality of initial construction of the building or the quality of materials used or both. In terms of material used for maintenance in her schools, principal Gabriella argued that *'it should be quality if we want the thing to last and reduce the frequency of defects'*. She insisted on the use of copper head taps instead of cheap plastic ones as replacement in her school despite the higher cost.

Secondly, another cause of maintenance is the wear and tear. Principal Elizabeth (S09) mentioned the high student numbers in her school which affects the wear and tear on her school facilities, especially toilets. As principal Irene (S05) emphasised, the number of students in the school is translated into a higher frequency of use, or *'constant usage'*, leading to constant wear and tear, which thus require maintenance.

Lastly, the findings of the study seem to indicate that besides the normal maintenance, abnormal wear and tear can be caused by improper use or abuse by the end users. The findings seem to indicate that this issue is particularly prevalent in the toilets in some schools. In one school, two students recounted their experience of seeing irresponsible students playing about and disturbing others by kicking the toilet doors. Student Aisha (S01) added that if the students do not vandalise the facilities, *'there would not be any damage [and] then, those things would remain undamaged there, so there is no need for maintenance'*. Besides that, one officer and one principal both cited the carelessness of a small number of students especially those living in hostels of dropping things like toothbrush, washing brushes, shampoo or soap into the toilets, causing them to be clogged. Nevertheless, these incidences were rare, judging from the

small number of such incidences reported during the interviews. The walk-through observations seem to concur with such a notion.

#### 4.6.1.2 Nature

In terms of nature, there are several effects on maintenance as the following section would elaborate. Firstly, one critical maintenance issue which needs to be addressed in two schools (S06 and S08) caused by nature is the subsidence problem with several of the teachers noting this in their open-ended survey section. It is perhaps due to the unique locations of schools which are quite near the coastal area that the knock-on effects of this subsidence issue are significant. Subsidence is believed to be the major cause of a multitude of constant maintenance issues in their schools, with the drainage system, pipes, sewerage and corridor to name but a few as indicated by teacher (S06T07) and (S08T08) from each school in their open-ended survey section. Their perception of such maintenance issues are validated during the school walk-through observations to both S06 and S08 schools as the following photographs (Photo 4-55 and Photo 4-56) demonstrated.



*Photo 4-55: Recently repaired drainage pipes (left) and floor cracks on sheltered pathway in S08 (right)*



*Photo 4-56: Damaged drainage (left) and cracked stairs in S06 (right)*

It appears that such a problem is not only limited to the two schools discussed above, as officer Neil (A1) recalled his own work experience in dealing with similar issues in some old schools under his care:

*The piling is unaffected, but the soil subsides. However, it does not cause building movement. But of course for us who do not know how to calculate the weight of the building would be concerned. We, as users, are worried. We also did not know that this could happen after more than 10 years. I have been to the site to see it for myself and it is true. There is one case that I went to, it is only a store for the dining hall where there is substantial subsidence. The structure, as I have been informed by Public Works Department, is safe.*

Through interviews with the respective principals of S06 and S08, it was found that their buildings are structurally safe as respective official verifications to that effect has been sought and received from the Public Works Department as the government expert in the matter.

Secondly, apart from subsidence, the location of school which is near the coastal areas also poses another critical maintenance issue. In this particular case, two schools (S06 and S08) were faced with the same problem of rust and corrosion. As one of S06 teachers (S06T07) noted, *'location of the school near the coast and sea have an effect, causing corrosion and rust to metal objects.'* Officer Neil (A5) also shared this opinion noting that *'if the school is near the sea, not even within 5 to 6 years, the metal products would get rusty.* He has witnessed for himself *'where the fan blades are rusty', they 'still can spin but we are worried that could fall off'*. The walk-through observation within the compounds of both schools (S06 and S08) supported such issue did exist. As demonstrated by the Photo 4-57, evidences of rust and corrosion on metal or iron items like the sheltered pathway and louvre window frame were clearly visible in the studied schools.



*Photo 4-57: Rust and corrosion on sheltered pathway in S06 (left) and window frames in S06 (right)*

Thirdly, another maintenance issue caused by nature primarily involved the roof. In some cases, location plays a part too. Strong gusts of winds or the occasional freak weather could cause the school roofs to be damaged or sometimes blown off as experienced by principal Irene (S05). Officer Kenny (A2) also cited *‘emergency cases ranges from storm or other natural disasters like flood and others’*. This would cause the school to be faced with unexpected maintenance issues, which would be treated as emergencies by MOEM and be repaired as soon as possible for safety reasons.

Fourthly, the findings indicated that building age could be another possible cause of maintenance. Common occurrence of leaking, broken and rusty old plumbing in one school S03 which were installed in the 80s as relayed by teacher Benjamin and principal Benedict is a prime example. Document reviews as shown in Appendix 21 seemed to corroborate this notion, particularly with regards to electrical wiring. It showed that the electrical system maintenance projects appeared to be evident in more than half of the school observed. As officer Mark (A4) noted, *‘for electrical wiring, we need to stand by for rewiring when it is more than 5 years’*. He added that *‘when the school gets older, therefore the building systems are older too [and] if there is no maintenance, I am sure the system would break down’*.

Fifthly, another possible natural cause of school maintenance would implicate wild animals, birds or insects. The following demonstrated some of the cases faced in some schools. In one particular school (S06), which is close to a nature reserve, wild monkeys caused damages to the roof tiles and earth safety wiring of the buildings in the school as shown in Photo 4-58.





*Photo 4-58: Damaged roof tiles (left) and earth wiring by wild monkey in S06 (right)*

For some schools located in the villages, other wild animals also contributed to the damage to school properties. As observed in two schools (S05 and S18), similar damages to their fences were evident, due to wild animals, particularly wild boars as shown in Photo 4-59.



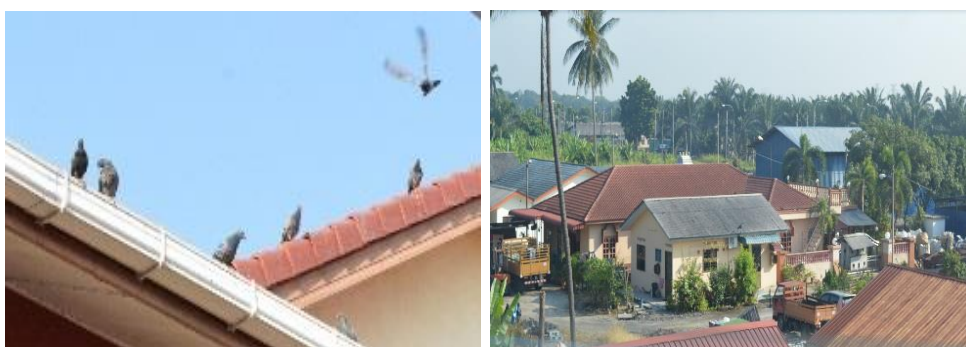
*Photo 4-59: Damaged school fences by wild animals (S05)*

Another school (S18) decided to install a new stronger and higher fence as a means to prevent such incursion into their school compound as shown in the following Photo 4-60.



*Photo 4-60: New higher and stronger school fence being installed (S18)*

In another school (S10), the maintenance issue was caused by reared birds which originated from their next door neighbour (Photo 4-61). They were deemed harmful pests in the school and were the cause of maintenance due to their extensive droppings along the school veranda as shown in Photo 4-62. According to its principal Felicia (S10), these droppings were also a health hazard to the school community, which must be cleaned using special chemical. Although complaints have been made to the proper authorities, the problem still persists.



*Photo 4-61: Reared pigeons on the school roof in S10 (left) and their source of origin next door (right)*



*Photo 4-62: Pigeons' droppings from roof/ceiling (left) and on the school veranda in S10 (right)*

For most of the schools visited, a common maintenance issue was caused by pest like termites. In one case, officer Neil (A5) alluded to the huge amount of request for pest control maintenance received from most schools under his care. Evidence from the school observations substantiated Neil's claim as demonstrated in the following photos. From the visual inspection, these attack occurred commonly on window frames (Photo 4-63), doors and door frames (Photo 4-64), which were usually made of wood.

In order to control the infestation of termites in schools, similar pest treatment like the one in Photo 4-65 was a common sight in almost every school. In school S01 and S06, they opted to change the window and door frame to aluminium or steel. As explained by principal Callahan (S06), this was done so that *'it would not be eaten by the termites'*.



*Photo 4-63: Termites attack on wooden window frames in S01 (left) and in S09 (right)*



*Photo 4-64: Termites attack on wooden door (left) and door frame in S03 (right)*



*Photo 4-65: Maintenance completed: Termite pest management (S03)*

However, in the case of one school (S03), despite continuous pest control efforts, there was *'the Self Access Learning room'*, which was rendered unusable because *'there are too many termites'* as principal Benedict (S03)



explained. He stated that *‘we already received the allocations and we will make the repair soon’*. Such examples, although rare, demonstrated the seriousness of termite issues in some schools, and its potential consequence, which in this case could affect the students’ independent learning.

In sum, the causes of school buildings maintenance as demonstrated above originated from either nature or humans, or combinations of both. In terms of natural causes, location of the schools could perhaps be one of the contributory factor. Human causes of maintenance could perhaps be attributed to factors like quality of material being used or even human behaviours. Regardless of its sources, these causes need to be taken into consideration and addressed accordingly.

#### **4.6.2 Maintenance resources**

Another key challenge indicated by the study is in relation to human and financial resources.

##### *4.6.2.1 Personnel*

As the findings of the interviews have indicated, there was a different level of human resource available for different schools; mentioned in section 4.5.4 and 4.5.6.2. While the fully residential schools and technical/vocational schools have dedicated in-house technical support staff, such personnel are unavailable for the national secondary schools and religious schools. This, in turn, could perhaps make school building maintenance a challenging task.

Several school administrators and teachers like Benjamin (S03) admitted such challenges exist. Benjamin, who is the senior assistant principal of a fully residential school (S03) recognised the advantages of having a school technician as a *‘huge plus’*. This is because the *‘designated personnel’* can focus on the myriads of maintenance tasks which usually require quick action and involve various forms and reports for submission to the relevant authorities. In addition, there is still a school carpenter in his school – an old position which has been since been eliminated from government civil services. As a result, teacher Benjamin who is the person in charge of overseeing maintenance claimed that he did not have a *‘headache’* as the task is made *‘much lighter’*. Hence, he empathised with those schools that do not have technical staff at

their disposal and where the *'teacher has to take it [school building matters] up, despite the fact that he has his teaching responsibilities and others'*.

Benjamin's opinion is reflected in national secondary and religious schools, as the responsibility of overseeing school building maintenance-related issues are normally placed under teachers, although they were not expected to carry out the works. In one such school (S14), even the official school bus driver was brought in to undertake minor maintenance as mentioned earlier in section 4.5.5.5. Interviews with officers also disclosed similar challenging scenario as limited personnel are being overstretched in relation to the increasing number of schools and departmental responsibilities, one of which are related to maintenance.

#### 4.6.2.2 Finance

Another resource which was prominently discussed by the respondents is the financial resource. 51% of the respondents felt that the amount of allocations for maintenance is inadequate as shown in Figure 4-23. Majority of adult respondents have expressed their concern with the insufficient funds available for school building maintenance as evidenced by Table 4-33.

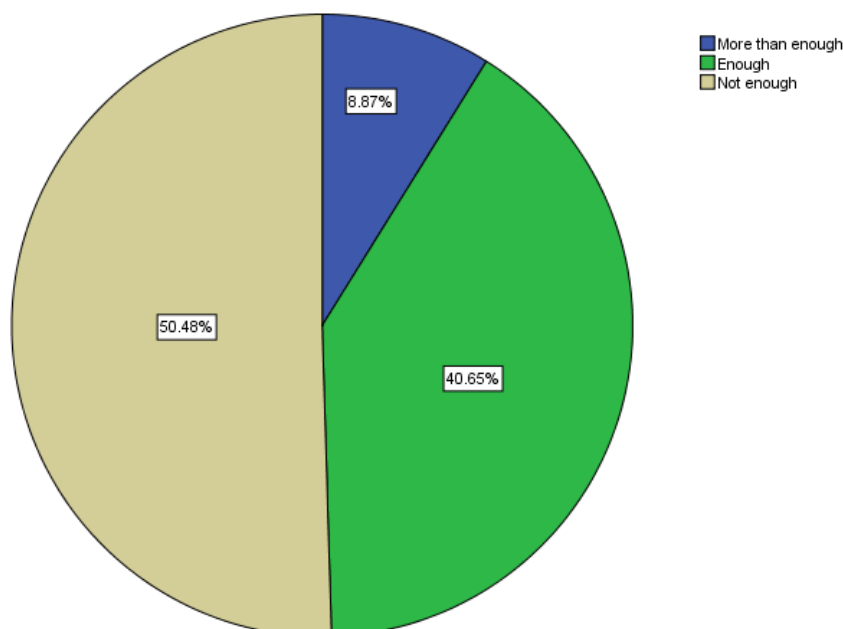


Figure 4-23: Adequacy of school maintenance funds

Interviewed officers like James (A1), Kenny (A2) and Larry (A3) agreed that there are insufficient funds for school building maintenance. James argued that

*‘this is because the number of maintenance requests from schools via the DEO and SED are very high compared to the approved funds for the Ministry for maintenance purpose’. Kenny agreed stating that ‘the annual allocation is insufficient to cater for the maintenance works that have been planned or unplanned’. He stated that emergency cases caused by natural disasters further compounded the matter. Inevitably, as officer James (A1) acknowledged, the school building maintenance undertaken in schools is based on ‘the financial capabilities of the government’.*

Respondent	More than enough		Enough		Not enough	
	No.	%	No.	%	No.	%
Officers	0	-	1	9.1	<b>10</b>	<b>90.9</b>
Principals	0	-	2	11.1	<b>16</b>	<b>88.9</b>
Teachers	2	1.1	32	17.8	<b>146</b>	<b>81.1</b>
Students	63	12.0	<b>263</b>	<b>50.2</b>	198	37.8

*Table 4-33: Adequacy of school building maintenance funds (Respondent type)*

At the school level, some of the principals were not only aware of the limited maintenance funds issue, but fully understood the situation as described earlier by the officers. Principal Cameron (S06) for instance felt that *‘it is adequate but sometimes it is not enough to repair all’*. His counterpart, a more experienced principal, Elizabeth (S09) explained:

*We understand because we are not the only one school. In an area which has many schools, to entertain the huge number, so sometimes we have to suppress our feelings. If the problem can be fixed, it is okay but if it cannot, what can we say. We have to manage on our own... they [DEO] too have many children [laugh].*

Concurring with her above counterpart, principal Felicia (S10) who has been at the DEO level previously, further elaborated:

*The school needs to understand that the allocation given the Ministry needs to be shared by a lot of schools, so we need to see the priority... we have to realise that there are other*

*schools that need them more. There are things that we need to give and take.*

Teachers like Abraham (S01) meanwhile represented the majority who also thought *'the amount of financial allocation is insufficient'* because *'when we make a report the response is, cannot fix it yet because there is no money'*. However, he admitted that he *'cannot say it accurately because we are not involved directly with this issue'*.

In contrast, the majority of students appeared to perceive the budget to be adequate, which perhaps is another sign indicating that they were generally satisfied with school buildings condition and its maintenance. Nevertheless, a substantial minority like Heidi (S16) thought otherwise. She noticed that *'they [school] have put up a under maintenance signage [the hostel toilets] but until now no maintenance was carried out, probably because there is not enough budget'*.

She was not alone as other students and teachers felt that the maintenance budget is a huge challenge especially to the school. For student Carl (S06), *'the challenge that I can see and notice for the school is the budget allocation for the maintenance'* because *'damage and maintenance require a high cost'*. Teacher Abraham (S01) meanwhile felt that money is a challenge because *'our school is funded by the government [and] therefore, all the maintenance and its expenditure would come from the Ministry'*. According to him, the allocation would be insufficient especially when there is unexpected maintenance works due to flood *'like the one that swept Kelantan recently'* and *'caused major damages to properties and belongings, chairs and tables and others'*.

Officers like James (A1) also felt that due to such financial constraints, *'the Ministry is unable to carry out comprehensive maintenance for all the schools'* which could consequently lead to potential *'delay of maintenance'* as termed by principal Felicia (S10). Nevertheless, officer Kenny (A2) is aware of the fact that *'when the maintenance works that were supposed to be done, but are not able to be carried out due to the insufficient allocation, it would have a bigger effect as it increases over time'*. In order to deal with this challenge of limited funds, officers Larry (A3) and Kenny (A2) agreed that *'the maintenance needs to be structured and prioritised'*, an opinion shared also by principal Cameron (S06).

This is where maintenance prioritisation comes into play as earlier explained in section 4.5.5.3.

From the data gathered through the interview and fieldwork notes, the schools have accepted this as a fact that needs to be properly managed. Managing expectation of the end users is difficult, as Benjamin (S03) was keen to point out, as some of them would be frustrated. Hence, in his opinion, the end users need to be made aware of the limited budget, as this would help them understand the situation. It adds further strength to reducing vandalism and increasing for the need of caring culture drive at the school.

In tackling the current issue of limited funding at the school level, in terms of the approach in allocations of maintenance (Figure 4-24), the respondents preferred that the schools were given the finance directly, via annual maintenance budget, a special one off-budget every five years, and based on school's application. As officer James (A1) argued '*I feel it is better that the funds are given directly to school with special autonomy without going through the DEO*'. Such preference indicated the common notion among administrators on the need to have the money necessary within their direct authority. This perhaps stems from the belief that this could ensure that their school would be maintained accordingly and any issues could be dealt with immediately. As principal Dominic (S07) argued '*specific financial allocations for maintenance for each school*' is necessary '*in order for maintenance to be managed properly*'.

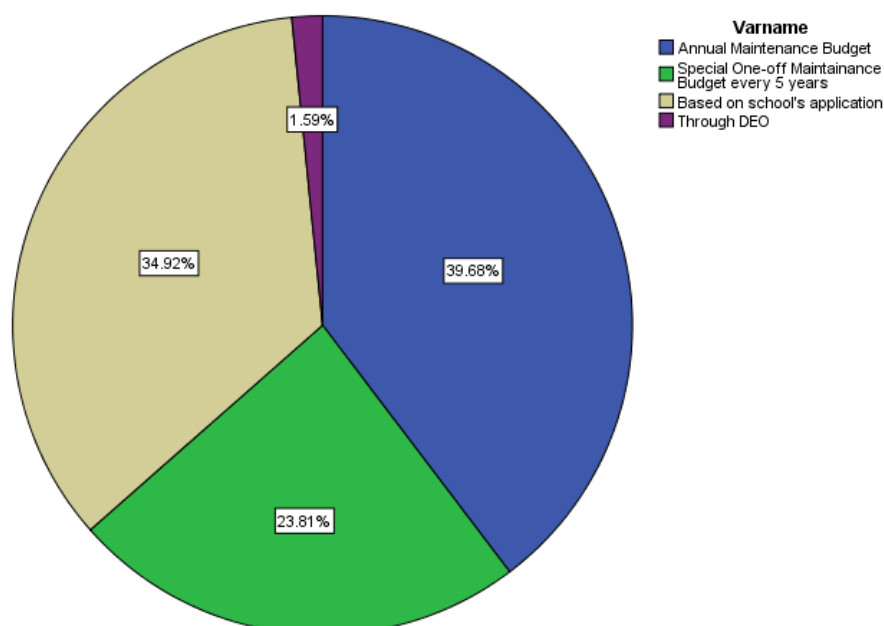


Figure 4-24: Maintenance allocation methods suggested

Owing to the limited funds available, the findings suggest that initiatives to find alternative financing were undertaken by schools by *'requesting help from PTA, private companies, individuals and others'*, according to teacher Abraham (S01).

For some principals, over reliance on government funding is impractical. Drawing from her experience as an education officer before, principal Felicia (S10) argued, *'sometimes, we cannot rely on funds or finance from DEO'*. Her opinion was validated by principal Irene (S05) who stated *that 'if we expect government's allocation, the problem would not be solved [because] the fund is limited'*. Instead, schools need to venture out to find alternative maintenance funding from other sources, being resourceful. For Felicia, *'that is all down to creativity, the most important is creativity'*. Again, Irene shared his counterpart's opinion:

*The solution depends on our capabilities. We do what we can afford. We must ask around. There is bound to be somebody.*

Queried further in terms of how she came to know about the availability of allocations for maintenance projects for her school prayer building from a non-governmental organisation, principal Irene (S05) explained her method:

*They [NGO] have pamphlets right? So I read their pamphlets and then I asked its staff whether it is possible for a school to apply. Then we send the proposal paper. So when I came here, I did just that and we got it.*

In this example, the personal resourcefulness of principal Irene paid off and both her former and current schools benefited from it.

*That is all our own initiatives. We must be creative. That thing is not in any circulars. It is not in any books. But human needs to think. That is what higher thinking skills are. That is why we need to think. But sometimes these things should not be considered as fixed or constant. Sometimes we asked from this person we couldn't get it, so we asked from someone else.*

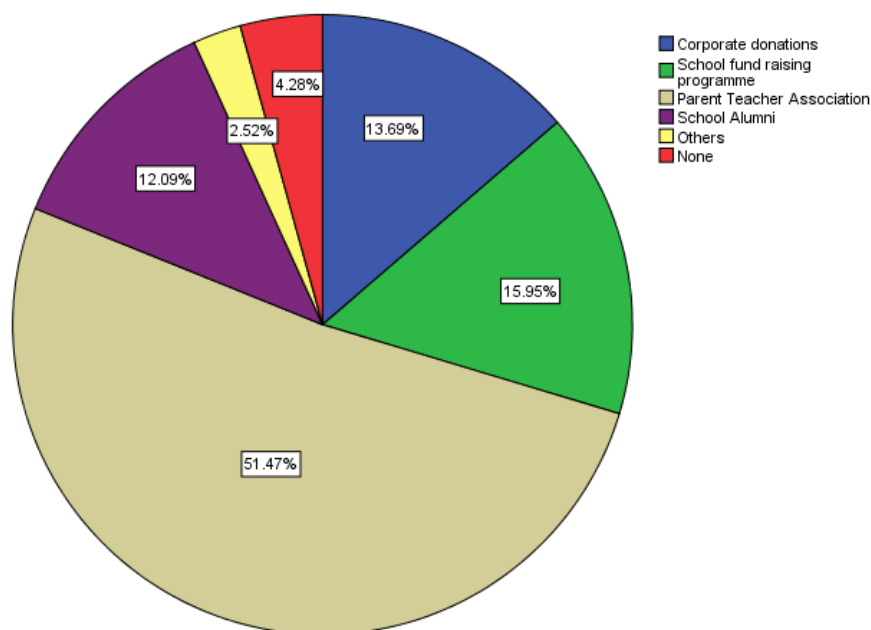


Figure 4-25: Alternative sources of maintenance finance

Figure 4-25 shows that the majority of respondents (51.4%) viewed PTA as one of the major contributor towards maintenance funding, as acknowledged by the respondents. For instance, principal Felicia (S10) acknowledged that her *'PTA plays an important role in assisting schools somewhat in building maintenance where possible'*. Her counterpart, Cameron (S06) admitted that his school received some funds from his PTA, besides other individuals' donations. His statement was supported by one of his subordinates, teacher Callahan (S06) who stated that *'if we need an immediate maintenance and there is no allocations, so we would ask for their help'*. Students like Hank (S16) also believed that his school's PTA is usually another source of finance for maintenance. Other alternative sources identified in the survey were the school fund raising programme (16%), corporate donation (14%) and Alumni (12%). This was acknowledged by officer Mark (A4) who stated *'alumni, school programme collection like walkathon or jogathon and wind orchestra programme'* among the contributors.

However, some expressed their concern on these external sources of funds for maintenance, particularly the limited capability of the PTAs and school alumni, for several reasons. Teacher Callahan (S06) recalled that *'so far there is none from the private sector or alumni because this school is still new and its members are not stable yet or just started working'*. His counterpart in school

S01, Abraham shared similar concern arguing that their *'PTA and the Alumni members live in faraway places on average, therefore their contribution is rather limited'*. He felt that he has *'yet to see a maximum contribution from either group'*. Principal Elizabeth (S09) concurred with Abraham's opinion, by giving her school as an example, albeit due to different reasons:

*So, to depend on PTA, they also have limited funds. This school's PTA is unlike other schools which have fixed deposits. This is closely related to the socio-economic status of the parents, like their jobs. Mostly they are not from a high income jobs, like factory workers or night market traders. Therefore, we cannot afford to collect a lot. So how?*

Factors like financial clout of PTA and alumni and the location of their respective members as well as socio-economic status were limiting the contribution to a certain extent. However, teacher Abraham (S01) remained optimistic about the possibility of particular PTA or alumni of schools being able to contribute to the maintenance of school building:

*If there are steps towards that, I think there should not be any problem because there are certain schools where their PTA are excellent and advanced in assisting the school. The same goes to the Alumni of certain prestige schools, where they are very influential and concerned about the condition of their school. They go on the ground to help, by making repairs to some facilities or adding more facilities to their school.*

His optimism has some credence to it, as one school (S03) which could be categorised as one of the most established and prestigious schools, did receive some form of donations from their alumni. As recounted by teacher Benjamin (S03), *'among the major maintenance in 2013 was the prayer building which cost about MYR 25000 given by the Alumni to repair the flooring with high quality standard which is very comfortable compared to previous one'*.

One other possible sources of fund for maintenance categorised as 'Others' above could be from the School Cooperative, as student Calvin (S06) explained:



*From what I know, we have a school cooperative here. This school cooperative provides many facilities, foods and drinks which we like to buy. Then that money is given back to us in the sense that the profits are always returned to us, which can then be used to develop our school in terms of the facilities that we have.*

However, efforts from the schools in terms of finding alternative financing for maintenance, exemplified by principals like Irene, did not go unnoticed by the officers, as one of them, Kenny (A2), lauded such initiatives as very helpful.

*At the school management level, we could not deny that there are principals who are very proactive in getting external funds. We actually are very thankful for these groups because they really helped us.*

#### **4.6.3 Administrators' knowledge and experience**

In this section, the officers and principal were examined with respect to their knowledge.

As illustrated in Figure 4-26, the majority (58.6%) administrators stated that they received enough information to make effective decision with regards to maintenance. However, slight differences occurred when officers and principals response are compared (Table 4-34). While the overwhelming majority of the officers considered enough information was received, the principals' situation is more equally split between them.

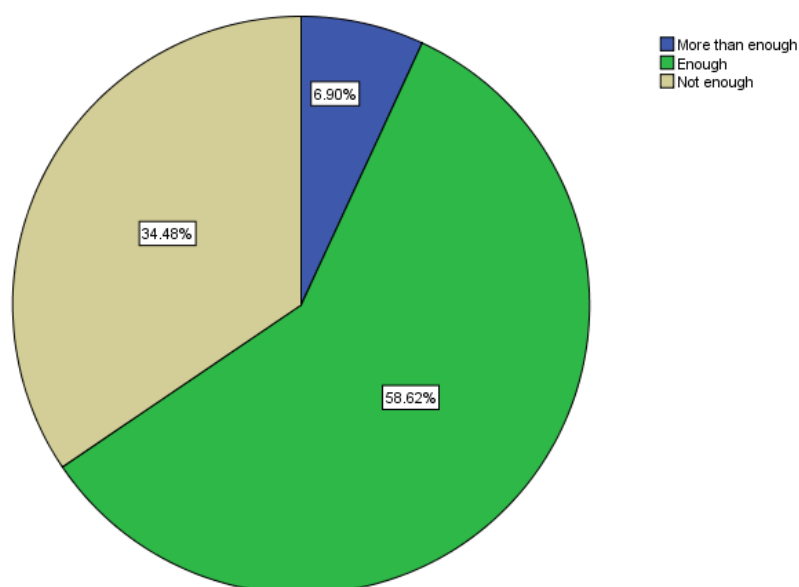


Figure 4-26: Adequacy of information received to make effective decision

Respondent	More than enough		Enough		Not enough	
	No.	%	No.	%	No.	%
Officers	0	-	9	81.8	2	18.2
Principals	2	11.2	8	44.4	8	44.4

Table 4-34: Adequacy of information received to make effective decision  
(Respondent type)

The interview data provided some clarification to this claim that the information received by the officers and principals is deemed enough to make effective decisions on maintenance. Firstly, the process and procedures were clearly established, some of which were mentioned in section 4.5.5. According to principal Felicia (S10), *‘as an administrator, we need to know the procedure’* and *‘anything that we do must be based on circulars and letters’*. Principal Eizabeth (S09) was also clear on the procedure of submitting maintenance reports saying that *‘if it is serious, we will take photos and produce a simple working paper about the defects’* and *‘after that we submitted to the DEO’*. The officers and principals were also aware that subsequent verification process, normally via site visit, would be carried out, either by the agency itself or through the DEO.

At the school level, in terms of how maintenance information or complaint is relayed was also clear, as explained in detail in section 4.5.5.1. The question is making sure that everyone plays an important role in relaying information to the

school administration if there is any maintenance required in their school - a belief that was keenly expressed by principal Felicia (S10) and Harrison (S16). As Harrison stressed *‘all have a very important role in ensuring that the school building maintenance is at a good level’*. Nevertheless, 44% of principals still considered they lacked the information on maintenance they needed. The reason for this could perhaps be largely explained by the aspect of training as discussed below.

As demonstrated in Figure 4-27, nearly half of the administrators (48.2%) felt that they did not receive enough training to manage school building maintenance effectively. This represents another key challenge which emerged from this study and will be discussed in detail in section 5.1.8.

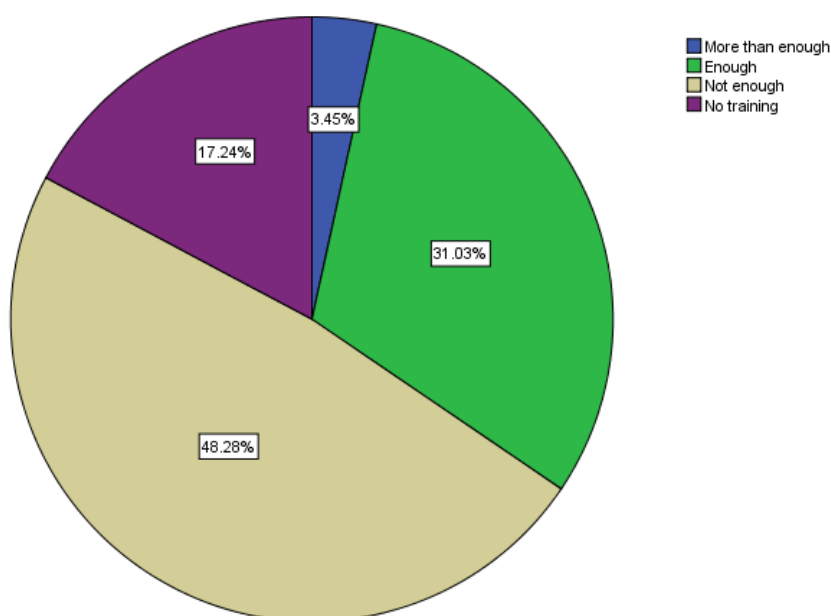


Figure 4-27: Adequacy of training in managing maintenance

Similar results at the officer and principal level are indicated in Table 4-35, where the majority of both groups stated that their training is insufficient.

Respondent	More than enough		Enough		Not enough		No training	
	No.	%	No.	%	No.	%	No.	%
Officers	0	-	4	36.4	5	45.5	2	18.1
Principals	1	5.6	5	27.8	9	50.0	3	16.6

Table 4-35: Adequacy of training in managing maintenance (Respondent type)

Principal Cameron's (S06) opinion during the interview encapsulated similar notions by the majority:

*Training is not enough. We did not undergone a formal training about building because we are not engineers [laugh].*

Cameron was aware that '*maintenance of building needs skills and knowledge*', without which could increase the risk of being conned by unscrupulous contractors and also '*resulted in us [principals] not being able to manage the allocations optimally*'. In terms of what is needed for a principal, he suggested a school building maintenance short course offering knowledge on '*the life span of certain building aspects or cost reduction*' so that '*we [principals] could know which one is efficient in terms of maintenance*'.

For those fortunate few, like James, an education officer (A1), '*the formal training that was given every year was related to the knowledge as a project manager, technical aspects, detail of maintenance through Bill of Quantity preparation*.' Principal Dominic (S07) also attended maintenance course '*once or twice at the Institut Aminuddin Baki [National Training Institute of School Leadership]*'. According to James, there are also some relevant courses offered by the Public Sector Training Institute (INTAN), or alternatively bespoke training by private companies. Others like officers Kenny (A2) and Neil (A5) have additional advantages due to their technical background of Civil Engineering and Electrical Engineering respectively. For Kenny, '*the background does really help, particularly in terms of knowledge of building*' but '*I learnt the rest through experience*'.

The majority, like principals Cameron (S06), Dominic (S07) and Elizabeth (S09) rely mostly on their personal on-the-job experience, so much so that Elizabeth remarked '*if one becomes a principal, without the experience, then it could be quite a headache [laugh]*'. She stated that some things are '*trial and error*' and '*as we experienced it, then we know*' as '*the norm will teach us*' whether maintenance can be postponed or not as '*we know the criteria*'. She emphasised further that '*we have to make our judgement sometimes based on our experience*'.

Thus, the interview data suggests that the knowledge and experience, either personal or from others, could prove to be valuable especially to the principals, in facing maintenance issues in schools. For instance, principals Cameron and Dominic both felt that their previous experiences as senior assistant were valuable. Cameron (S06) recounted his own tenure which further strengthened his belief that experience is an indispensable component in school building maintenance planning as follows:

*Every year the principal spends around MYR 10,000 to fix burst pipes in his school. As he would expect that to happen every year, he therefore reserves that amount. True enough, at the end of year, it is as he predicted. That shows his ability, skills and knowledge.*

Meanwhile, principals Dominic (S07) and Felicia (S10) admitted that their prior experience working in SED and DEO respectively are also vital. While Dominic has personally '*assisted in the maintenance of schools under my [his] sector's supervision*', Felicia '*learnt about the various procedures*' and '*physical problems of schools*', through '*observations and discussion with the DEO officers*' which were '*informal but useful nonetheless*'.

Similar types of informal exchange also seem to be evident within the principal's circle. As revealed by Elizabeth (S09), '*information sharing does happen between principals*' where '*sometimes we refer to our principal colleagues on how they approach certain cases*' or to get '*some tips*' because '*we could not live on our own*'. If necessary, '*we would refer to DEO*' for advice on proper procedures.

The study findings seem to indicate most principals heavily relied on their cumulative personal experiences gained from previous positions in other schools, district or state level posts, and also consultation with their counterparts. This is perhaps due to the lack of training on school building maintenance management, which is a potential area that could be addressed by MOEM.

#### 4.6.4 Stakeholders' engagement

Another major challenge which emerged from the study findings is the engagement of stakeholders with school building maintenance in most schools. The survey result as shown in Figure 4-28 indicated that there were 15 different groups of stakeholders who were involved in school building maintenance. It also showed that the top four prominent groups are namely school administrators, teachers, parents and students. Perhaps two points of interest could be gleaned from such result.

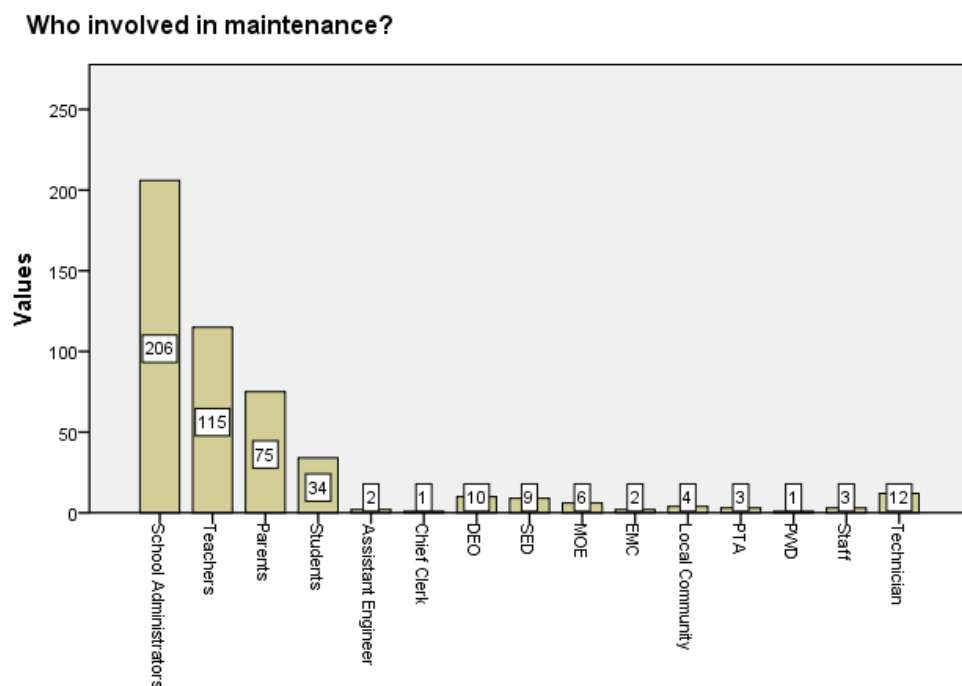


Figure 4-28: Involvement with school building maintenance

Firstly, each stakeholder has a vital role to play both individually and collectively in the context of school building maintenance. What this means is that everyone is part of the school building maintenance equation, regardless whether he or she is an internal or external stakeholder of the school. Earlier findings in section 4.5.5.1 have also indicated that these stakeholders play a role in school maintenance. This hinted at the wider web of interdependence which exists both with the internal school community and its external community that surrounds the issue of school building maintenance.

Secondly, aside from parents, the significant groups are the schools' internal stakeholders themselves, namely the school administration led by the principal,

teachers and students. To a certain extent, this reflects the valuable contribution of these groups in particular in school building maintenance context, as principal Felicia (S10) was keen to point out:

*...we need to be vigilant, alert and always monitor the school physical condition especially from the aspect of electrical wiring, drainage, toilets and others. It is very important. That is the responsibility of everyone including the students.*

Principal Harrison (S16) also shared Felicia's (S10) views as he gave his thoughts on the matter:

*For me, each members of the school community has a role to play, from the students to the top of the school management in school building maintenance. For instance, if the students see any defect, they need to report it to the teacher. Then the teacher would submit a defect report. Finally, the school administrators would make the decision. Therefore, each party has its role, and no one should be left out to enable the smooth process. For me, all have a very important role in ensuring that the school building maintenance is at a good level.*

The students involvement in school building maintenance is perhaps typified by the their role as complainant as the above interview suggested. This was corroborated by student Amy (S01) acknowledged that maintenance problems would be reported to their teacher. Nevertheless, the walk-through observations revealed another typical contribution by the students, in the form of mural paintings (Photo 4-37), which are commonly found in all the schools visited as earlier stated in section 4.3.3.

Another direct involvement of students in two schools (S09 and S19) found in the study as mentioned earlier in section 4.5.5.5 demonstrated the enormous potential of what internal stakeholders' engagement can offer to the school building maintenance effort. In the two above mentioned schools, certain groups of students who enrolled in courses related to school building maintenance, namely air-conditioning services (S16) and plumbing (S09), were integrated into their respective school building maintenance drive, as part of their practical experiential learning dimension. Under their teachers' strict supervision, these

students put their knowledge and skills to the test by undertaking simple maintenance in the school related to their subject. The interviews suggested that all respective principals, teachers and students agreed on the mutual benefits of such concerted initiative. Most importantly, as principal Irene (S05) remarked, *'when everyone feels involved, there is a sense of ownership'*. The fact that a formal school certificate of appreciation were given to these students is further proof of the schools' acknowledgement of their students' valuable contributions to the school.

Unsurprisingly, the most common form of external stakeholders' engagement is mostly with the PTA, with a varying degree of success, while only a few schools in the study actively engage other stakeholders. Perhaps one example of good external stakeholders' engagement was evident in school S07 as noted earlier in section 4.5.5.5, where the principal disclosed the successful implementation of the MOEM's parent engagement toolkit programme outlined in its national education blueprint. In this case, all the parents were invited in a special open day to see for themselves their children's classroom and asked to contribute in any way or form to improve its condition. Following the programme's success, planning as already underway to expand the initiative to the school hostels. As earlier mentioned in section 4.5.5.5, in another school (S11), the teacher disclosed that they are going to have a school 'gotong royong' (communal) day in the coming weekend to clean the school surroundings and paint the school buildings. He also stated that the paints would be sponsored by a paint company that they approached. To a certain extent, such examples are perhaps further proof of the potential rewards by leveraging on the external stakeholders in meeting the many challenges of school maintenance.

Nevertheless, as earlier mentioned in section 4.6.2.2, in engaging the stakeholders, there are still many factors that limit their involvement in school maintenance. Unsuitable location of domicile as well as socio-economic status were some of the constraints mentioned by principal Elizabeth (S09) and teacher Callahan (S06). One could perhaps agree to teacher Abraham's (S01) statement when he said that a maximum contribution from stakeholders in the context of school building maintenance is yet to be seen.



The other external stakeholders engagement is with the education officers, especially in relation to maintenance planning, resources, enquiries and also advice. As earlier mentioned in section 4.5.2, in the case of maintenance planning, the schools usually have to submit information for maintenance needs to their respective agencies annually. In terms of requests for additional funds submitted by schools as mentioned in section 4.5.5.4, these officers would go to the school in order to verify the request. After some consideration by the agency, they will make the decision and disburse the money if the funds are available. If not, the request would be forwarded to other departments like finance for the necessary fund. This would later be given to the agency to be distributed to schools. From time to time, communications between the school and agency were made which revolved around enquiries and advice related to school building maintenance as disclosed by principal Elizabeth (S09) previously in section 4.6.3.

By synthesizing the available quantitative and qualitative data further, the current study offers some ideas by presenting the key roles that the internal and external stakeholders' roles can and have played in the context of school building maintenance as the following paragraphs elaborate.

#### *4.6.4.1 Internal stakeholders*

The first group that are going to be looked at are the internal stakeholders which comprises of school principals, teachers and students.

##### *4.6.4.1.1 Principal*

In the context of the current study, it appears that the principal has many roles in school building maintenance context as shown in Figure 4-29.



*Figure 4-29: Roles of principal*

At the centre, the principal is ultimately the leader of the school. As principal Elizabeth (S09) put it, *'we must have one common ground'*, which essentially mean the vision of what the school wants to achieve. This is primarily relayed through school meetings with teachers and staff as exemplified by principal Anderson (S01).

Another important role of school principal in the school building maintenance context is as the manager and planner. For instance, principal Irene (S05) managed to successfully plan and mobilise all her support staff to address the maintenance issue of pot-holes on the school roads and dilapidated school walls (Photo 4-51) during school holidays, using donations that she collected.

In the next role, the principal could also be the monitor. Such role requires the principal to constantly monitor the school physical condition in terms of what maintenance is needed and the maintenance work being carried out in the school. As principal Cameron (S06) emphasised, monitoring is important during the maintenance project implementation so as to *'see for ourselves how the maintenance work fulfils the need and Standard Operating Procedure (SOP) requirements, because ultimately we are the ones who are responsible to make the payment'*. This is corroborated by officer Larry (A3) who confirmed that the

end users, namely the principals, have to monitor the work quality of the maintenance because '*usually it is they who validate the contractor's work*', by completing a special recommendation section in the work report for any works undertaken by the contractors.

Besides that, the school principal is the advocate of good maintenance culture by relaying to his/her subordinates and students on the need to take care of the school building and facilities. In one school (S03), teacher Benjamin, observed a similar role of his principal as the maintenance advocate in his school saying that '*the principal will say all those things on the proper manner of use and not to be cruel to nature*' during any talks and school assemblies as well as meeting with teachers. Principal Anderson (S01) disclosed that he emphasised in his meetings with teachers the need that any maintenance issues are reported by all, including the students. Apart from that, he also highlighted on the need for early prevention and maintenance works to be carried out.

The principal of the school is also the final decision maker at the school level, in terms of what, when, where and how the maintenance is going to be carried out. Inevitably, in most cases, this role is assisted by his committee or assistant principals or teachers, where ideas and proposals are discussed and ultimately actions are decided upon.

The school principal also plays a role as a mediator between the internal and external stakeholders in dealing with the maintenance issue. As internal end users namely the teachers and students relay their concern about any maintenance issues, the principal as the official school administrator, if needed, would bring the matter up to the relevant external authorities like the DEO, SED and MOEM or others like PTA, private contractors or others.

Lastly, the principal can be the initiator of the whole maintenance activities in his school. As alluded to by teacher Benjamin (S03), his principal '*would find the issue himself*' by going about the school with the technician to find any maintenance issues. The interviews also suggested that this approach is prevalent or the norm, whereby most of the school principals tend to go around the schools to get a view of the current condition of their schools.

#### 4.6.4.1.2 Teacher

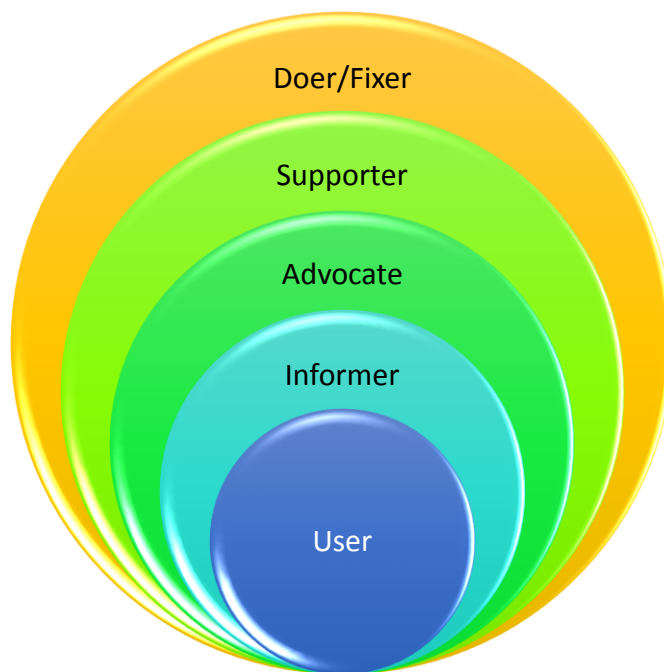


Figure 4-30: Roles of teacher

The current study findings has shown that some of the teachers are already involved directly or indirectly in the school building maintenance at various level as demonstrated in Figure 4-30. Firstly, at the very basic level, the teacher is a normal end user. In this role, the teacher can be perhaps considered as a mere passive consumer from the building and its facilities.

At the second level, the teacher can become a more active participant in the maintenance process by acting as an informer or complainant of the school maintenance issues, raising them through the channels provided by the school administrations. Such examples from the current study ranged from the use of conventional maintenance report book, official school meetings or social media as the case may be in one school (S03).

At the third level, the teacher's role is as the advocate, namely by encouraging the students to take good care of their school building and facilities. This is exemplified by teacher Benjamin (S03), who said that *'in our talk or announcement, we asked the students to use the facilities properly and not damage them'*. In one particular school (S17), the topic 'How to care for your buildings' was chosen as the focus of the coming monthly Monday school

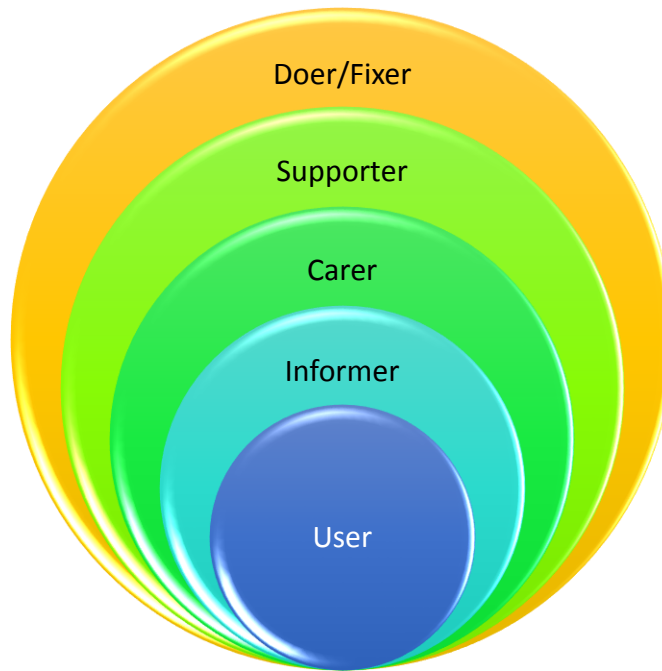
assembly function. In other schools, signs are visibly displayed in strategic areas like toilets for the pupils to reaffirm the school's philosophy of good maintenance practices and their valuable role.

At the fourth level, the teachers can become the supporter. In this role, they contribute their efforts in different ways like financial donations or moral support. Teacher Emanuelle (S09) cited some of his colleagues' contribution in terms of *'technical know-how on maintenance and repair work'* in aspects like piping, electrical and others based on their individual's background, working experience and skills that they possess.

Lastly, the highest level of involvement would be as the fixer/doer. In this role, they delivered the highest form of contribution by getting physically involved with the maintenance activities themselves. Teacher Abraham (S01) stated that there are some small maintenance which were carried out by the teachers themselves like *'replacing the bulbs or taps, so the cost is lower than if we call an external contractor'*. These individuals took initiatives on their own to avoid going through the bureaucratic process which sometimes took quite a length of time.

#### *4.6.4.1.3 Student*

Based on the interviews of the study, one could propose that the students are not merely passive recipients or end users of the school and its facilities but instead they could take or are taking a more active role in the maintenance process. As student Alex (S01) eloquently put it, *'we cannot rely solely on the school to do the maintenance, we have to play our part because this is our school'*. His personal opinion on a more active role of students in the school building maintenance dimension reflects the possibility of such involvement.



*Figure 4-31: Roles of student*

The model shown in Figure 4-31 illustrates the level of involvement of the students in school building maintenance in their school. Firstly, at the basic level each of them is the end-user of the school building and its facilities.

Moving up a level, the student can be a more active participant in the maintenance chain by being the informer or complainant in terms of addressing maintenance issue in their school. At this second level, they could report the maintenance issue to the teachers or school administrators. Student Amy (S01) described this role succinctly: *‘when there is any problem, we would report it to the teacher so that she could take the necessary action to fix it...We take the first action and do not let it be’*.

The third stage of involvement is as the carer where the students takes good care of their school building and facilities by using them properly and with respect. Alan, another S01 student, acknowledged that *‘the students can contribute by not damaging the school properties, by using them in a proper and careful manner’*.

In the fourth stage, the student can become the supporter where they could contribute their efforts in terms of financial donations or moral support. Student

Aisha, Alan's schoolmate, said that she '*is not really into doing the maintenance work*'. Instead, she argued that she can '*donate money*' as she would '*rather help from the back*'. By this she means that '*we help by giving money or donation to the PTA*'.

Lastly, the highest level of students' involvement would be as the fixer/doer as they took the highest form of contribution by getting physically involved with certain maintenance activities themselves, for instance by repainting the wall or servicing the air conditioner or fixing the plumbing as demonstrated in two schools (S09 and S16). Further evidence from the interview with some of the students and teachers in both schools pointed to some positive implications in adopting such approach: a) feeling of pride as active contributor to the school; b) nurture better care and positive attitudes towards their school buildings.

#### 4.6.4.2 External stakeholders

With reference to the external stakeholders of education officers and parents, the interview data offered some ideas as to what their vital roles are in the context of school building maintenance.

##### 4.6.4.2.1 Education officer



Figure 4-32: Roles of education officer

The integral role of MOEM and SED officers in the schools' success in any initiatives including school building maintenance is of equal importance as depicted in Figure 4-32.

Due to the centralised nature of educational management in Malaysia, almost all the support received by the school is channelled from the MOEM through its Division or SED or DEO. This is perhaps the primary role of the officers as the main patron for their respective schools on the ground. Such supports are in the form of, but not limited to, materials, personnel, finance, advice and expertise as the findings in section 4.6.4 pointed out.

Secondly, education officers manage and plan relevant resources in terms of finance primarily for the purpose of school building maintenance. This is exemplified by officer Neil (A5) who stated that for some minor electrical maintenance issues, sometimes, his agency would allocate the money to the school to buy the electrical parts or components and asked the Equipment Maintenance Center officers to carry out the maintenance works.

Thirdly, with the disbursement of the maintenance funds, the education officers also need to monitor the progress of the maintenance works being carried out. As mentioned by officer Neil, financial allocations through '*warrants*' that have been given to any schools would be monitored '*to check their project status and procedures*' at the Ministry's level.

Fourthly, the officer also plays the important role of advisor to the schools. This advice is in matters pertaining to school buildings maintenance like procedures of procurement and others as previously mentioned in section 4.6.4.

In most cases, request for maintenance funds or the like is submitted to the officers, represents their fifth role as the decision maker in the school building maintenance context. The approval and allocations of maintenance funds, existing or additional at the agency level, is one common example of this role played by the education officers as remarked by officer .

The sixth role that officers play is as the mediator in a context whereby maintenance issues are related to other MOEM Divisions or external agencies like utility companies or local authorities. Such a role was exemplified by the

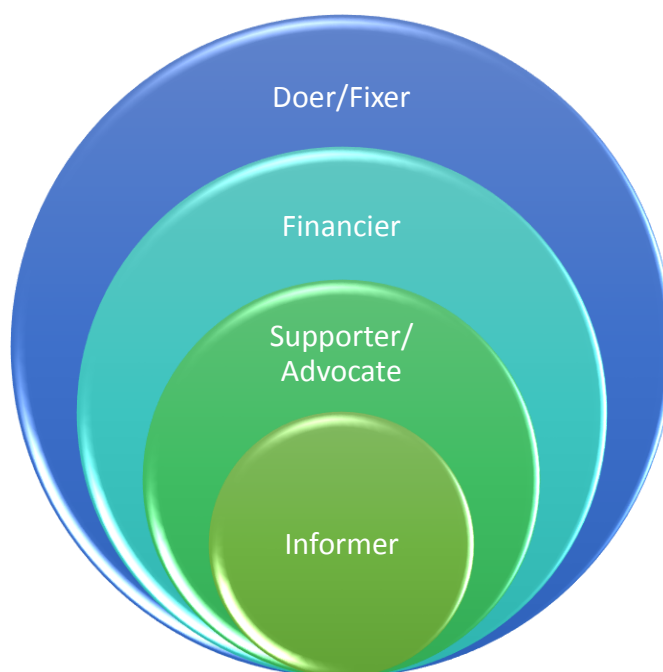


forwarding of the schools' additional fund requests to other related divisions for assistance as alluded to in section 4.6.4.

Last but not least, the officers also act as initiators of school building maintenance programmes, particularly where these programmes are centrally-driven based on the synthetisation of maintenance needs and requests submitted by the schools as discussed in section 4.5.2.

It is perhaps worth to remember that these officers may have to put on different hats simultaneously at times. These roles appear to overlap or are similar to the ones held by the principals. This could be attributed to the similarity of roles as administrators that both groups share. One major difference is the scale in which the officers and principals manage school buildings maintenance. While each principal manages his/her own school buildings maintenance, the officer manages a huge number of schools under their care. For instance, officer Mark (A4) has 69 schools nationwide under his supervision (Appendix 7). In sum, whatever their roles, they form an indispensable link in the realisation of school building maintenance initiatives at the school level.

#### *4.6.4.2.2 Parents and community*



*Figure 4-33: Roles of Parent Teacher Association*

Based on the current study findings, the model shown in Figure 4-33 is offered to demonstrate the level of involvement of the parents or PTA in terms of school building maintenance in their children's school. Firstly, at the bottom level is the informer, where the parents could point out to the maintenance issue in the meeting or directly report the maintenance issue to the school administrators.

At the next level, the parents can become an advocate of good and proper conduct of their children. This could be through instilling such respect starting from home by advocating and setting a good example on the proper usage of, for instance, the toilet facility. As such indirectly, the parents could promote the feeling of care and respect towards the school facilities in their own children, which could be carried over in their schools.

At the next level, they can become a more active participant in the maintenance chain dimension by acting as the financier of the school building maintenance efforts by extending financial donations to such activities. In the context of the current research, findings as shown in Figure 4-25 suggests that PTA has been valuable in this respect, becoming the biggest alternative financial contributor to school building maintenance initiative. Nonetheless, there is also a limitation in terms of sources of funds of PTA, which in most cases is still a huge constraint as affirmed by the current study in section 4.6.2.2.

The highest level of involvement would be as the fixer/doer as they become physically involved with the maintenance activities themselves, usually by joining through the communal activities or effort by the school. In the context of the current study, participation from parents appears to be promising, with some of the schools (S07 and S11) visited subscribing to this method all this while, inviting parents to communal events of tidying up the school compound by cleaning and painting the school as previously mentioned in section 4.6.4. However, there are some challenges that limits the parents' involvement that are difficult to overcome, like far location of domicile from the school and lower socio-economic status which was pointed out by the findings.

#### **4.6.5 Key findings**

The key findings for this section are as follow:

<b>Maintenance funds are experienced as insufficient.</b>
<b>Maintenance personnel is needed for some schools.</b>
<b>Internal and external stakeholders have important roles to play in school building maintenance.</b>
<b>School leaders lack adequate knowledge and experience in school building maintenance.</b>

#### **4.7 Summary**

Several findings were noted with reference to the current practices of maintenance of school building in Malaysia. Firstly, the policy of school building maintenance was not defined in a single document, but encompassed various general policies on building maintenance and maintenance-related documents including formal policy directives, government circulars, professional circulars, the national education blueprint as well as the national development plan as shown in Appendix 26. The current common policy framework associated with school building maintenance was subsumed under the Safe School policy represented by the School Health, Safety and Beautification national programme. Secondly, maintenance planning which was currently practiced was a mixture of both short and long-term, with the former being the most dominant. Thirdly, the findings pointed to a common set of procedures for maintenance which was fully understood and adhered to with regards to submission of maintenance complaints, request for additional funds, prioritisation criteria and maintenance implementation. However, other

alternative approaches to maintenance implementation were noted. Fourthly, current study findings also disclosed that there was some form of established committee at the school level, the School Health, Safety and Beautification Committee (3K committee) as shown in Appendix 20A. One of the committee's duties was to monitor and handle maintenance matters. In terms of maintenance personnel, slight differentiation is evident. For both fully residential and technical/vocational schools, dedicated in-house technical staff in the form of technician and assistant engineers was available. For the rest of the schools, no such support was available. Fifthly, in terms of maintenance funds, the federal government appears to be the primary contributor. Lastly, it was interesting to note that within a centralised nature of education in Malaysia, several notable maintenance innovations were in evidence in the form of alternative practical solution, implementation, communication and funding.

Besides that, several findings were noted with regards to the implications of school building maintenance. The findings of this study seemed to allude to the fact that generally speaking, all the school buildings were deemed to be between the 'adequate' and 'good' classification, regardless of their school types, age, and locations. This result indicated that the schools only require between some preventative maintenance and minor maintenance for their school buildings. Regardless of their type, the majorities of respondents felt satisfied with the vital school building aspects, namely lighting, ventilation, fans, internal air quality as well as ceiling, walls, floors, windows, and doors. They also considered their schools were regularly maintained and comfortable, besides looking pleasant, neat and clean. In addition, the majority also agreed that the school buildings had enough teaching and learning space and were adequate to support the learning process.

The findings also suggest that the school buildings condition could also affect the ability of the school in several ways. In terms of the schools' ability to offer extended learning period, maintain a safe and orderly environment, and create positive school climate, the majority of respondents, regardless of types, felt that each has 'medium' to 'high impact'. They also felt that the most of the school facilities were able to meet the educational programme needs. The school building also have positive effect as the majority regardless of types felt 'proud' of their school buildings. In addition, the school building and

maintenance also produced a mixed positive and negative feelings and emotions, depending on the situation.

Four main challenges were discovered based on the study findings. The first challenge was related to urgent maintenance issues faced in schools: electrical system, water supply, plumbing, toilet, roof and fans. The second challenge was the causes of maintenance issues, which were classified into two: human and nature. The third challenge of school building maintenance that was identified was associated with maintenance resources, namely limited funds and personnel. The fourth challenge was the administrators' lack of knowledge and experience of school building maintenance. The final key challenge was the stakeholders' engagement.

Besides the above mentioned findings, it is also fascinating to note that the study also revealed some additional unintended findings, which are primarily related to the students. The findings suggest that the students were aware of their school physical surroundings and events that occurred in their schools. More importantly they are able to describe the effects of maintenance in relation to their learning process as well as feeling and emotions that follows.

Nevertheless, it is worth noting that each school is different as are their building maintenance needs. This was clearly alluded to by principal Felicia (S10) who emphasised that *'different schools have different [physical] problems'*, while recounting her previous experience working at the DEO. Despite that being said, this does not mean that there are no similarities at all in terms of their type of maintenance aspects that they faced in schools. For instance, the maintenance policies were essentially the same. Its maintenance organisations were similar in nature but perhaps different in name and membership, with the 3K committee being the most common. Despite the similarity and difference of resources, school maintenance practices were commonly shared. The only difference was in maintenance implementations where they were distinctly different in some cases, due to the need to be creative and innovate.

Nevertheless, maintenance priorities remained constant across the schools, with safety, comfort and aesthetics being the core considerations. All these the findings presented above offer a promising basis for discussion, which will be pursued in greater detail in the next chapter.

## Chapter 5. Discussion

This chapter will be focusing on the discussion of several key findings that were identified from the current school building maintenance practices, challenges and implications mentioned earlier in Chapter 4. It is hoped that the discussion of these key findings would be valuable so as to inform and stimulate further debates on the current policy and practices of school building maintenance, with the view of improving them in the foreseeable future in Malaysia and beyond. To this end, several practical recommendations specifically suited for the local context are offered, although their wider applications in similar situations internationally are possible.

### 5.1 Summary of key findings and practical recommendations

These are the summary of key findings of the study which would be subsequently discussed in relation to their practical recommendations respectively in the following sub-sections.

1.	The school buildings are in good condition and well-maintained. Classrooms conditions are satisfactory and school buildings are comfortable for teaching and learning.	Section 4.2.5 Section 4.3.8
2.	School building maintenance affects school buildings, teaching and learning, as well as occupants.	Section 4.4.6
3.	Maintenance planning is predominantly short-term.	Section 4.5.8
4.	Maintenance innovations are evident and important in schools.	Section 4.5.8
5.	Maintenance funds are experienced as insufficient.	Section 4.6.5
6.	Maintenance personnel is needed for some schools.	Section 4.6.5
7.	Internal and external stakeholders have important roles to play in school building maintenance.	Section 4.6.5
8.	School leaders lack adequate knowledge and experience in school building maintenance.	Section 4.6.5

*Table 5-1: Summary of key findings*

***5.1.1 The school buildings are in good condition and well-maintained, while the classrooms conditions are satisfactory and school buildings are comfortable for teaching and learning***

In terms of the overall school building condition, generally all schools were found to be within the 'Adequate' and 'Good' category, which are also reflected at the individual school level. Such findings indicate that all the school buildings only require either routine or minor maintenance or some preventative maintenance and corrective repair. This seems to concur with the overall satisfaction that the schools were generally well-maintained. Their classrooms' conditions are also in a satisfactory condition and comfortable for teaching and learning.

The findings bode well for both administrators and end users alike. For the administrators, they have performed their duties well by ensuring the school buildings are well maintained (Thompson *et al.*, 2013) and conducive to student learning (Crampton *et al.*, 2004). All their continuous school building maintenance efforts have managed to produce school buildings that are fit for their intended purpose of education. For the end users, such good and well-maintained school building conditions mean that their teaching and learning process can proceed within a comfortable school environment which they need.

***5.1.1.1 Continue school building maintenance initiatives***

Despite these positive findings however, school building maintenance efforts by the schools need to continue as physical defects and deterioration of the school buildings prompted by factors like time, the elements and normal wear will inevitably occur as the time goes by (Hawkins and Lilley, 1998). Therefore, without the necessary on-going maintenance, the school building condition will deteriorate instead (Vincent and Filardo, 2008). In other words, continuous and regular maintenance is recommended so as to keep schools in good condition (US Department of Education, 2000a).

***5.1.1.2 Address school building maintenance issue immediately***

It is worth remembering that findings also point to the need to address the routine or minor maintenance or some preventative maintenance and corrective repair in the schools. As such, these existing school building maintenance issues have be resolved as soon as possible because their deferment would

potentially accumulate and present a bigger challenge in the long run. As mentioned earlier in section 2.4.3.2, the ramifications for such deferment are in terms of huge financial costs of maintenance backlog and poor school building conditions in some developed countries like US (Filardo, 2016), Canada (Hansen, 1993), Australia (Victorian Auditor-General Office, 2008) and UK (UK Audit Commission, 2003). They serve as a sobering reminder for others, when insufficient consideration has been given to regular school building maintenance (Baker and Peters, 1963).

### **5.1.2 The school building maintenance affects school buildings, teaching and learning, as well as occupants**

As the study findings show, the school building maintenance affects education in a multitude of ways. Essentially, the school buildings and their maintenance can support or obstruct quality education (Filardo, 2002) in various fronts as follows: quality of school building condition; quality of teaching and learning environment; quality of educational programme and activities; and quality of occupants' well-being as well as feeling and emotions. Hence, it is pertinent upon policy-makers and other stakeholders to ensure that school buildings are well-maintained as this could have a detrimental influence on the quality of education being offered to the child in schools as the physical component of school building is one important dimension of quality education that needs to be taken into consideration (UNESCO Institute for Statistics, 2012).

#### **5.1.2.1 Consider school building maintenance as top educational quality agenda and investment**

As school building maintenance matters to the venue of education, teaching and learning as well as teachers and students, it should always be at the forefront of any educational quality agenda. Therefore, any cost incurred in school building maintenance should not be considered as necessary cost but necessary investment instead, so as to '*maximise an effective learning environment*' (Lunenburg, 2010, p. 1). After all, it has been argued that in terms of school building condition, adequacy and management, it is directly under the control of the government, hence school buildings improvement '*offers a feasible opportunity*' for improving the students' academic performance (Buckley *et al.*, 2004b, p. 2).



Policy-makers need to be reminded that any financial reduction would not only affect maintenance budgets but most importantly, students and teachers currently on the ground (Berner, 1993). At the end of the day, the most important one must be these end users, who more often than not, does not have the choice in the matter. Furthermore, there is a need to better comprehend the significance of offering every student with a conducive environment for teaching and learning and thus make the necessary financial resources available to guarantee adequate school facilities for all the children (Agron, 2000).

### ***5.1.3 Maintenance planning is predominantly short-term***

The findings indicate that short-term maintenance planning is more dominant, with mostly reactive approach. However, this not unique to Malaysia as it is also the norm in other developed nations like Australia (Victorian Auditor-General Office, 2008) and USA (Chan and Richardson, 2005). The primary reason as to why this is a case in Malaysia and these countries are due to limited financial resources (Chan and Richardson, 2005; Victorian Auditor-General Office, 2008). However, the fact that school building maintenance policy sources are traced to multiple official documents (Appendix 26) and long-term maintenance planning are based more on personal experiences than proper knowledge and information could be other influential factors.

#### ***5.1.3.1 Produce a comprehensive school building maintenance policy***

It is recommended that all relevant information contained in the various official documents (Appendix 26) are streamlined into a single comprehensive school building maintenance policy document. Previous MOEM's Strategic Interim Plan 2011-2020 (Ministry of Education Malaysia, 2012b) could also be useful basis for producing this new document. Hence, this new school building maintenance policy will act as a management framework by outlining the overall maintenance policy including the common goal, vision and objectives, building and their expected service life component, corrective and preventative maintenance as well as the required standard (Royal Institution of Chartered Surveyors, 1990; Lee and Wordsworth, 2001; Chanter and Swallow, 2008; Lee and Scott, 2009) for all schools nationwide. This document should then be made available as

hardcopies or online as the primary official reference for any personnel involved in school building maintenance at any level nationwide.

#### *5.1.3.2 Produce a school building maintenance planning guide*

In conjunction with a new school building maintenance policy, a more systematic approach that encompasses the long-term perspective in the near future is also recommended. To this end, a written guideline for school building maintenance planning is essential. The 'Planning Guide for Maintaining School Facilities' (US Department of Education, 2003) could serve as a reference model in coming up with such document. This can enable the school principals to use it as the primary guideline to plan their school building maintenance in a more systematic and efficient manner, for both short and long-term. Such document could be valuable in providing the vital standardised reference guide in hardcopy form or online for the administrators both at MOEM and school level in producing their own maintenance plan document.

#### **5.1.4 Maintenance innovations are evident and important in schools**

There is one key finding of maintenance practices worthy of further discussion in this section, namely maintenance innovation as mentioned in section 4.5.7. One very interesting discovery from the current study is that most principals, who are ultimately responsible for the condition of their school buildings (Institut Aminuddin Baki, 1979; Jantan, 2005), have been found to display a high sense of personal agency and creativity by adopting innovation within the existing system in managing school building maintenance. In a context of constraints in terms of resources and capacities, there were several schools leaders who shifted their overall outlook on the maintenance by innovating and thinking out of the box. Instead of concentrating on how something should be done, these schools deliberated on the many alternative ways of doing things (ISDR *et al.*, 2009). Hence, these school principals were able to build on the experience of innovative problem solving to bridge the gap between unique local maintenance needs and available resources as alluded to in section 4.5.7. Essentially, these front-liners were addressing internal problems through innovation (Borins, 2001) and working smarter (Albury, 2005) within the constraints of needing to remain efficient, effective and responsive public managers (Moore, 2005). It is due to such type of 'out-of-the-box' thinking by school principals that made these

various innovations (practical solutions; implementation methods; alternative funding resources; and communication avenues) possible. In such schools, innovations have mobilised the stakeholders to alter their practices where if not, *'they would probably have hedged their bets by doing less or doing nothing at all'* (Fullan, 1992, p. 12). This is a positive indication that grassroots innovation on the school ground which is essential in education (Singer and Woolner, 2015) is alive and well, despite the centralised nature of the Malaysian education system. After all, previous research suggests that innovative ideas in public sector comes from all levels of organisation, although public sector innovations are traditionally viewed as originating from the top (Borins, 2001). It is perhaps possible to assume that the centralised landscape of Malaysian education provides a stable backdrop suited for some of these innovative ideas and creativity to flourish.

#### ***5.1.4.1 Encourage and share maintenance innovations***

As the findings have indicated, such innovative practices found in the study are important as they offered practical alternatives or maintenance best practices that could be shared, adopted or adapted by other schools. Therefore it is recommended that such maintenance innovations are encouraged by the MOEM. To this end, the MOEM's annual Innovative and Creative Team Innovation Convention offers a suitable existing platform to spread these innovations to a wider audiences especially school principals. This would stimulate further maintenance innovations to take place at whatever level within the MOEM. These maintenance innovations could also be included in the school building maintenance planning guide, where they could be adopted or adapted for use in similar context.

#### ***5.1.5 Maintenance funds are experienced as insufficient***

The school building maintenance would not be able to be performed if monetary provision is insufficient or absent (New Jersey Institute of Technology, 1990; Mushumbusi, 1999) as all types of maintenance require funds (Seeley, 1987). Thus, the availability of sufficient funds is required to bear *'the educational performance and life cost'* of a school building which are equally important as its initial cost (Kay, 1990, p. 417).

The issue of insufficient funds for maintenance was the recurrent theme in the findings in section 4.6.2.2 as well as past research both in local Malaysian context and internationally. Previous research in education funding in Malaysia also corroborated current study results, indicating that financial provision in general and for maintenance in particular is insufficient (Marzuki, 2006; Marzuki, 2008). As the current findings alluded to, there is insufficient maintenance budget for schools to cater for the actual needs of the school as earlier works argued (Marzuki, 2006). As a result, the school needs to strategise by performing maintenance in stages based on priorities as mentioned in section 4.5.5.3.

As the main source of education financing in Malaysia is from the federal government (Gani *et al.*, 2012), hence, it is unsurprising to discover that in terms of maintenance financing in Malaysia, there is a high dependency on government funds as shown in section 4.5.6.1. With regards to the distribution of educational funds for school operations including maintenance, it is in the form of federal government grants allocated on a per capita basis (per enrolled student basis) (Finance Division, 2010; OECD, 2013), which is deemed simple, objective and easily managed and monitored (OECD, 2013). Current findings corroborated previous work (Marzuki, 2008) that there are two major non-subject financial grants are the Other Annual Recurrent Expenditures (LPBT) and Other Special Expenditures (LPK) for all schools (Finance Division, 2010) as shown in Appendix 27. However, due to the nature of this generic fund which competes with other equally vital operational expenses like printing, school stocks and teaching supply (Marzuki, 2006) (Appendix 27), the maintenance budget is hence limited and insufficient as indicated in section 4.6.2.2.

Nevertheless, there is an additional source of finance for five schools (S03, S07, S08, S14, and S18) gained by their status as Cluster Schools of Excellence. Under their Special Cluster Schools provision, these schools would be able to spend a certain percentage of the financial provision on maintenance (Ministry of Education Malaysia, 2016a). This means that these fortunate few are able to add to their budget for maintenance on top of the existing federal grant if such needs do arise.

#### *5.1.5.1 Establish dedicated annual school maintenance funds*

Instead of allocating the maintenance budget under the current LPBT and LPK per capita grant which competes with other operational expenses, a dedicated annual financial allocation specifically for maintenance purpose is recommended. This is to ensure that a committed amount of funds is available for the school to plan and undertake the school building maintenance, especially minor ones, throughout the year. This is somewhat similar to the plan contained in MOEM's Strategic Interim Plan 2011-2020 and the UK's maintenance allocation model.

Besides that, in line with the concept of Let Managers manage within the Modified Budget System implementation in Treasury Circular No. 7/2008 (Ministry of Finance Malaysia, 2008 ), it is suggested that the financial resource is given directly to these school principals, which is preferred by the school themselves as indicated in section 4.6.2.2. Such measure also matches the government's move towards a school-based management approach and increased school autonomy as outlined in the current education blueprint in Shift 6 (Appendix 1) (Ministry of Education Malaysia, 2012c). Furthermore, it paves the way for a better school buildings maintenance planning by the principal who are closer to the educational service delivery at the school level, whose decision making would be more suitable than those who are far removed and most occasions out of touch with the needs on the ground (Hill and Bonan, 1991).

#### *5.1.5.2 Review budget formulation for maintenance funds*

In terms of budget allocation amount, school building maintenance has traditionally been calculated based on the number of enrolment in Malaysia, like UK. Perhaps such approach is too simplistic. Hence, a revised budget formulation for school building maintenance that is closely aligned to the different needs of the individual school is recommended, which takes into consideration more critical school building factors like its age and condition, so as to ensure that a satisfactory standard is achieved across all schools (UK Audit Commission, 2003). In addition, the geographical location of the schools also needs to be considered, as the current study findings suggest.

#### *5.1.5.3 Continue prioritised-approach in maintenance*

In the case of Malaysia, it is highly improbable that there would be considerable rise in the education budgets anytime soon, considering an already large financial provisions for Malaysian education by the federal government (UNESCO, 2015b). The MOEM themselves acknowledged such reality, admitting that it is highly unlikely that additional allocations can be made available for the education system (Ministry of Education Malaysia, 2013a).

What the government can do is to continuously improve the state of affairs by ensuring that the best solution based on the value for money on the capital expenditure is realised (Shen *et al.*, 1998). With this in mind, a maintenance programme which is based on priorities assessment and up to date data of the school building condition is perhaps necessary (Lee and Scott, 2009) and would assist in realising the best use of existing resources (Shen *et al.*, 1998). Such carefully targeted investment in maintenance would thus enable a significant impact on the delivery of education for the students (Thorne *et al.*, 2013). The findings indicate that such a prioritisation-based approach in school building maintenance is already being practiced in Malaysia, similar to other countries like UK (UK Department of Education and Science, 1985) and Canada (Ministry of Education Ontario, 2010). Such an approach needs to be continued to enable sustainability in the long term.

#### *5.1.5.4 Encourage external funds through engagement*

In Malaysia, as the study findings discovered, some limited external financial support from individuals or public and private entities are also available, where in most cases, points to the central role of and assistance from the school Parent Teacher Associations (PTA) in this respect. Nevertheless, financial contributions by the private sector or corporate sector towards school building maintenance are also in evidence. It is this sector that needs to be further engaged by the MOEM, SED, DEO or the schools themselves, using the existing school and parent engagement toolkit programme, as an alternative source of maintenance funds.

### **5.1.6 Maintenance personnel is needed for some schools**

Another key finding is the limited availability of personnel as pointed out earlier in section 4.5.6.2. The challenge is perhaps more evident in national and religious schools where technical support staffs are not available. Nevertheless, one could perhaps understand that the availability of in-house technical staff is perhaps more appropriate in all schools, due to the very specific nature of maintenance works and responsibilities, which mostly require specific technical knowledge, skill and expertise – something which teachers typically do not possess. Such arrangement is also beneficial as the maintenance will be the main focus appropriate to their job specifications, which a teacher would be unable to fully commit to and focus on due to their already packed teaching responsibilities throughout the day. Findings from fully residential and technical/vocational schools suggest that having these technical personnel to attend to any maintenance matters are a huge advantage especially when dealing with minor maintenance issues.

#### **5.1.6.1 Expand maintenance personnel allocation**

It is recommended that the current policy on the availability of maintenance personnel are reviewed. As the findings suggest, school building maintenance issues needs to be handled by a qualified expert – an approach which has long been adopted by other developed nations. These are called assistant caretaker, caretaker and site/premises manager who are either part-timers or full-time (Blatchford *et al.*, 2009; Whitehorn, 2010; UNISON, 2016) in UK and head custodian and custodians (Kowalski, 2002; Chan and Richardson, 2005; Office of Superintendent of Public Instruction, 2010) in US.

The most ideal model already in existence locally lies with the technical/vocational and fully residential schools where in-house support is available. Such a model can be expanded to the other secondary schools, if deemed suitable. Nevertheless, it must be said that although placing one technical maintenance staff for each school is ideal, there are various long-term implications for such a move to be considered: additional public service posts; wages; remunerations; and ultimately additional costs for the government. This is significant considering the huge number of schools in Malaysia which are around 10,173 as earlier mentioned in section 1.2.9 (Table 1-4).

Alternatively, the establishment of a maintenance technical support team at the district level like the US model is much more realistic and cost effective. It is a specialised Maintenance and Operation Department that serves district-wide schools (Earthman and Lemasters, 2013) which may consist of maintenance personnel like school building engineer, general maintenance mechanic (USREAP, 2016), painters, masons, plumbers (Kowalski, 2002), electricians, HVAC specialist, locksmiths and carpenters (Office of Superintendent of Public Instruction, 2010), depending on the size of the school districts (Kowalski, 2002). In the Malaysian context, such department could be centrally placed at the district (DEO) or state (SED) level, where these dedicated maintenance personnel are responsible for the maintenance of the whole school district rather than individual schools because their maintenance skills are usually not required continuously in one school (Kowalski, 2002).

#### ***5.1.7 Internal and external stakeholders have important roles to play in school building maintenance***

Another key findings is that each individual does play a role in terms of the school operations and care of its physical environment (Cohen *et al.*, 2009). This is vital as with a carefully thought out operation and maintenance plan which includes all stakeholders, there is a better chance of the plan being accepted and contributing to the overall situation (Zoomerplaag and Mooijman, 2005). As all stakeholders become more involved in and buy into the school building maintenance initiative at any level of involvement beyond merely as end users, there is ample opportunity to access deeper benefits of working together, especially in terms of leveraging the wealth of knowledge, information, influence as well as resources of such partnership. This is based on the belief that '*education thrives on partnership and collaboration - within schools, between schools and with other groups and organisations*' (Robinson and Aronica, 2015, p. 233). At the end of the day, a successful school building maintenance program calls for the cooperation, dedication and involvement of everyone at all levels who understand and support the cause (Sullivan *et al.*, 2010).

In addition, in such a scenario where each individual contributes to the school's operation and the care towards the school physical environment, a positive and sustained school climate could be realised (Center for Social and Emotional



Educational and Education Commission of the States, 2007). Its physical manifestation would be in the form of school facilities that are well-maintained, consequently giving rise to students, teachers, parents and the community who are proud of their school (Zoomerplaag and Mooijman, 2005).

#### *5.1.7.1 Principal as visionary and leader in school building maintenance*

At the centre of the school building maintenance initiative, it is the school leader who plays the most vital role. Previous research has indicated that school leaders and their actions '*dictate a definite role in providing proper maintenance, renovation, and improvements in school facilities*' (Brannon, 2000, p. 4). The current study findings not only supports such aforementioned findings by Brannon (2000), but more importantly, it offers an overview of what these vital roles are. As school leaders, their tasks is not purely about improving test scores but to develop a sense of community among its stakeholders including students, teachers, parents and staff, '*who need to share a common set of purpose*' (Robinson and Aronica, 2015, p. 188) or vision (Robinson and Aronica, 2015), namely that the school buildings are theirs.

Next, their task is to mobilise these internal and external stakeholders' commitment into '*actions designed to improve things*' (Fullan, 2001, p. 9). Perhaps more importantly is the need to encourage the internal and external community to participate and become agent of change '*who can see the shape of a different future and are determined to bring it about through their own actions and by working with others*' (Robinson and Aronica, 2015, p. 251). In the current study, there are some schools which actively engage and establish a smart partnership with their internal (S05, S09, S16) and external (S07 and S11) stakeholders. They serve as empirical examples that such partnership is possible and can make a substantial contribution to the school building maintenance efforts, and consequently the conducive learning environment that the students require.

The fact that communal effort or 'gotong-royong' has been traditionally practiced in schools and already part of the Malaysian culture makes it a potential area to be harnessed further for school building maintenance purposes. The existence of mural paintings by the students (Photo 4.37) throughout all the schools

visited are encouraging signs that these small communal efforts and active students' involvement are already in place and being practised.

#### *5.1.7.2 Engage internal stakeholders (students)*

The first internal stakeholders that need to be on board are the students, who represents the majority of the school community. Students' participation is not only beneficial and feasible in various aspects, but their active involvement in their school buildings also have educational merits. As one of the primary objective of education is '*to enable students to understand the world around them and the talents within them so that they can become fulfilled individuals and active, compassionate citizens*' (Robinson and Aronica, 2015, p. xvi), the school building maintenance is one of the potential platform which could be exploited to achieve this end. In other words, students are made to understand that they are not a mere passive recipient of the education process in schools, but inevitably they are the citizens of the school, which carries with it certain roles and responsibilities because '*school is a living community*' (Robinson and Aronica, 2015, p. 64), which to a certain extent is reflective of the broader society at large. Hence, to be able to be an active member of the community in future, the school context provides a logical platform and opportunity as the first step towards this end, where the children are prepared for society (Born, 2000). By being active member of their school, they are regarded as a responsible agents of change instead of merely product of change (Kushman, 1997). After all, it is their school, and their active involvement with its maintenance should consequently nurture better care and positive attitudes towards the school building of which they are its end users (Worrell, 1945; Wakeham, 2003) by instilling the sense of pride (Worrell, 1945) and ownership of the school, thus leading to the reduction of negative behaviours like vandalism among students (Hallam, 1996)

#### *5.1.7.3 Engage external stakeholders (parents)*

The second group that should be engaged are the external stakeholders, especially the parents. Such similar belief on smart partnership is also apparent in MOEM's current policy approach, as it acknowledges the important role all of the above stakeholders play individually and collectively in their contribution towards the realisation of the blueprint initiatives (Ministry of Education Malaysia, 2015b). With this in mind, the MOEM's school and parents' engagement toolkit have already outlined the aspects and how parents and community can get

involved and help the schools - one of which is in providing a conducive learning environment (Ministry of Education Malaysia, 2015b). Therefore, all the principals need to do are to put these into practice by engaging the parents and community to actively participate in the school building maintenance initiative. As witnessed in some of the schools (S07 and S11), such engagements are undertaken by inviting the parents into the school and offering them an opportunity to contribute to the school. The end results have been quite a success, manifested by the improved school learning environment and increased sense of ownership by both children and their parents. Similar approach is common in other parts of the world like the Italian Reggio Emilia, whereby the participation from students' parents take varying practical forms, one of which is by contributing to the school building maintenance, through volunteering their experience, knowledge and skills to repair furniture, paint surfaces and equipment (Learning and Teaching Scotland, 2006).

#### ***5.1.8 School leaders lack knowledge and experience in school building maintenance***

Despite the fact that the management of the school buildings is one of the role of a principal that is mostly underrated (Merrill, 1946), it is a critical feature of a school's daily operations and hence, it is paramount that the school principals are well prepared (Tubbs *et al.*, 2011). This is particularly critical in light of their primary responsibility of ensuring the schools buildings are safe, healthy and efficiently managed (Glatthorn, 2000; Shideler, 2001; Berry, 2002; Chan and McCleod, 2005). Likewise in Malaysia, school building maintenance is one of the management duties of a Malaysian school principal (Institut Aminuddin Baki, 1979; Jantan, 2005) and domain of school management according to the Standard of Competency of School Principal in Malaysia (Institut Aminuddin Baki, 2006).

However, as revealed by the current study findings in section 4.6.3, the necessary knowledge and skills of school building maintenance, especially of the school leaders, are lacking and therefore needs addressing. They cited that the school management course with regards to environmental and physical facilities management component is more general in nature, and does not address specific knowledge on school building maintenance. Hence, in order to

better manage their school facilities, it is necessary to ensure that these school leaders are also adequately equipped with the necessary knowledge and skills to do this part of their job.

Nevertheless, as previous research has pointed out, building maintenance is naturally a complex process requiring a lot of knowledge (Fong and Wong, 2005). Unfortunately, while some of this building maintenance knowledge is partly accessible by referring to published documents like standards, guidelines and codes of practice as shown in Appendix 26, another part is only attainable via personal experiences (Fong and Wong, 2005). Interviews from the school leaders reaffirm such an argument, citing learning through experience as a critical dimension of their knowledge accumulation on school building maintenance.

#### *5.1.8.1 Utilise CPD and NPQEL programme for capacity building*

Hence, in order to address this competency issue, two existing structured platforms namely the Continuous Professional Development (CPD) programme and National Professional Qualification for Educational Leaders (NPQEL) course could be utilised (Ministry of Education Malaysia, 2013a) to meet the needs of current school leaders and future school principals respectively. A specific module on physical school building management could be added to the two aforementioned platforms. This is in line with an earlier study that showed the principals felt that they could gain advantages in enrolling in school facilities and maintenance related courses especially to understand specific aspects like construction, budgeting and maintenance, thus enabling them to offer students the conducive environment for their learning (Barbra, 2006) and meeting the quality and standard of educational facilities (Agron, 2000). Previous Malaysian research has also suggested that in order to strengthen the school management system, technical skills and knowledge are also essential - one of which is school building maintenance (Jantan, 2005).

In addition, the inclusion of experienced school principals in workshop sessions within the current CPD and NPQEL framework to share the aforementioned innovations or best practices in school building maintenance could also be explored, as a means of capacity building within the principal fraternity by tapping into their colleagues' professional experiences. Apart from that, a

centrally organised annual professional conference or publications organised by the existing Malaysian National Council of School Principals could be another additional platform to be considered as further strengthening measures to enhance their capacity to better manage their school buildings.

The above discussion of key findings and practical recommendations demonstrate that school building maintenance is far from easy and straightforward, as some of them typically overlap or are inter-connected. For instance, the short-term maintenance planning is highly influenced by the insufficient funds. Hence, one needs to appreciate that school building maintenance is a complex subject. To account for this complexity, an alternative perspective on the subject is perhaps necessary, which is offered in the section that follows.

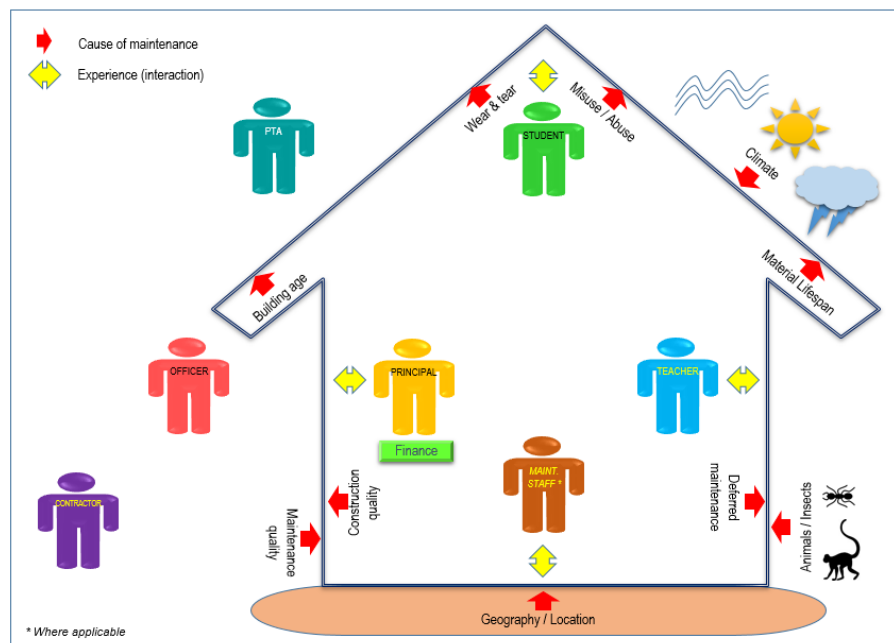
## **5.2 School building maintenance: an ecological model**

It is within the human nature to compartmentalise and frame any issue in a cause-affect linear perspective to make it easier to comprehend and digest (Baker and Bernstein, 2012), which unfortunately is not always practical. Perhaps a better perspective is to gain a more holistic view and better understanding of the school building maintenance issue.

Before venturing further, perhaps one needs to be reminded that the building itself is a complex object. As alluded to in section 2.1.1 earlier, the school building itself must be regarded as a complex set of interrelated systems and components (Lstiburek and Carmody, 1994; National Research Council, 2006). This view is further substantiated by the fact that any change in the building subsystem can affect an assembly, the building envelope, and the entire building characteristics in the end (Lstiburek and Carmody, 1994). In other words, together they '*influence the context within which the learning process occur, with the physical school building being a significant part of this ecological equilibrium*' (Lackney, 1999c, p. 19). Essentially, what it means is that all these building systems or components work together to provide the necessary conducive environmental condition within the school building for the teaching and learning process. The study findings in section 4.3.2 serves as a useful reminder that this is the case, as the comfortable classroom environment is only

possible when these three elements (lightings, fans and electricity supply) work in tandem.

Apart from the above mentioned mutual interaction between the building envelopes, assemblies, and subsystems with each other, one also need to take into account the inevitable interplay between the environmental and climatic conditions in which the building is situated, as well as the building occupants. As Ishak *et al.* (2007, p. 89) argued, '*the built environment is the product of a complex interaction between external environment, building materials, design, content, activities in buildings and its occupants*'. In other words, the overall condition and performance of the school building is the result of the following combination: the interaction between its building components and systems; the interaction with its users; maintenance practices (National Building Councils, 2016) and the external environment within which it is situated. As shown in Figure 5-1, the findings on the causes of school building maintenance perpetrated by human and nature as aforementioned in section 4.6.1 have demonstrated that such interactions do exist between the school building (e.g. material lifespan; age), occupants (e.g. teacher; students) and the external environment (e.g. climate/weather; animals; soil/location; officers). Hence, any attempt at manipulating any one of these elements without taking into account the potential effects on the others can be '*at worst ineffective and at best inefficient and costly*' (Ishak *et al.*, 2007, p. 89) as '*the interactions of different elements are as important as the consideration of a single element*' (Higgins *et al.*, 2005, p. 22).



*Figure 5-1: Interactions between building, occupants and external environment*

Besides appreciating the complexity and dynamic interplay as shown above in Figure 5-1, the same perspective is perhaps required when one view the school and education. In this respect, Goodlad's (1984) study on what makes an effective school presents some practical and sound advice which perhaps are still relevant to this day in the current study context of school building maintenance. He argued that in order to improve school, firstly one must understand it and to improve schooling, one must improve the individual schools (Goodlad, 1984). To this end, he suggested that how all elements (e.g. staff, leadership, parents, community, resources and environment) work together in an individual school needs to be examined (Goodlad, 1984). After all, school is fundamentally a complex element, which is made up of people, physical setting and organisation (Woolner, 2015). In the case of the current study, this is perhaps exemplified by the key challenges of school building maintenance which encompass people, organisations, resources and nature – all of which are closely inter-related.

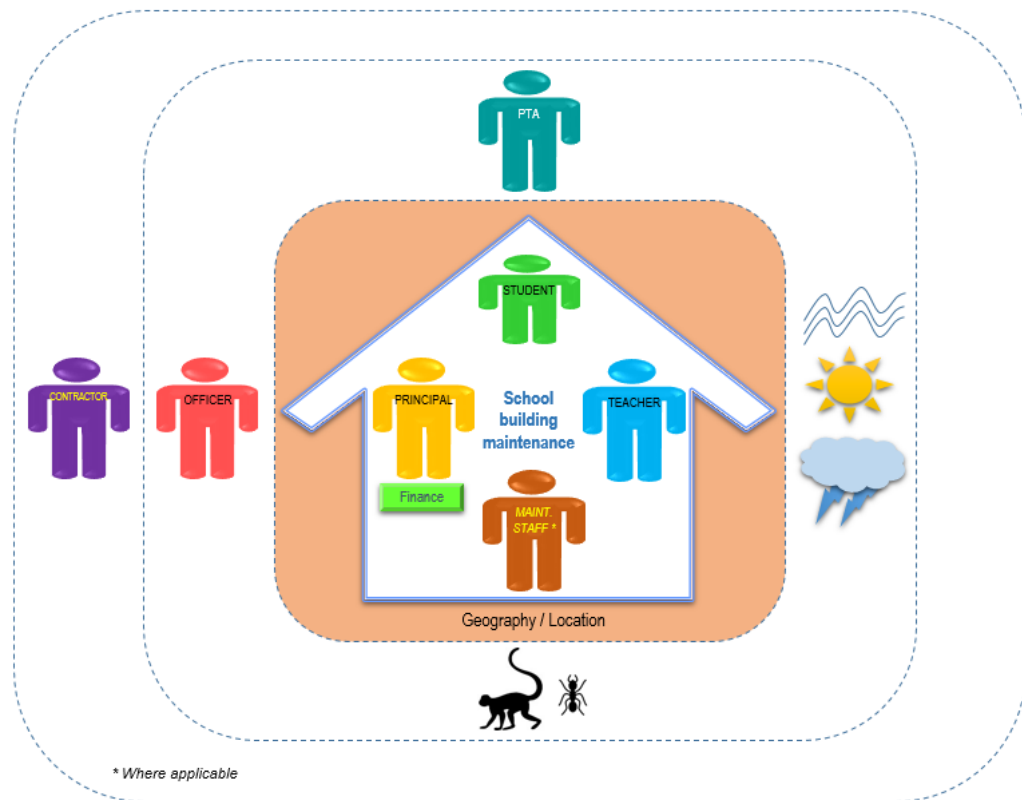
Perhaps there is a tendency to view the school building maintenance as an internal matter for individual school, which to a certain extent is true. However, such a fragmented outlook may be misleading and represents a missed opportunity to appreciate the complexity of the issue of school building

maintenance. One must not forget that a school is part of a bigger education system. Similarly, the educational system is a '*complex and dynamic system with multidirectional linkages and processes that interconnect the different layers within the system*' (Johnson, 2008, p. 9). The classrooms, schools, local education authorities, districts, states and nations are all located within the educational systems (Springfield and Mackay, 2016). Basically, these components are nested whereby each is also part of a larger education system: schools organised into districts, districts into states; and states into the country (Springfield and Mackay, 2016). Likewise, in the current study context, as mentioned in previous section 1.2.4, the Malaysian schools are indeed nested and also managed within multiple layers of districts (DEO), states (SED) and country (MOEM).

As the findings of the current study have demonstrated, such mutual interactions between these layers (Johnson, 2008) and components (Springfield and Mackay, 2016) do exist and are critical in understanding the issue of school building maintenance. Equally important are the causes of maintenance and maintenance resources which need to be considered.

Henceforth, there is a need to think and approach the school building and its maintenance from an alternate perspective and account for such complexity (Goodlad, 1984; Johnson, 2008; Woolner, 2015; Springfield and Mackay, 2016). Therefore, an ecological model is offered in Figure 5-2. Such an ecological perspective has profound implications to our understanding of the school building maintenance as from such viewpoint, one can appreciate that '*building [school] is one of the component of lived-in world of people [contractor, officer, principal, teacher, maintenance staff, student, PTA] and other organisms [animals and insects]*' (Herva, 2005, p. 216), which are situated in a specific geographical location and associated weather attributes.





*Figure 5-2: Ecological model of school building maintenance (Individual school) drawn from the study*

This ecological model is deemed appropriate because it appears to sufficiently encapsulate the complexity and dynamic mutual reciprocal interaction between the relevant elements of the school building (e.g. age), its building systems, external environment (e.g. climate, location, insects and animals), organisation (e.g. financial and personnel resources) and its stakeholders (e.g. administrators, end users, PTA), all of which are nested in the broader educational and social context as shown in Figure 5-3.

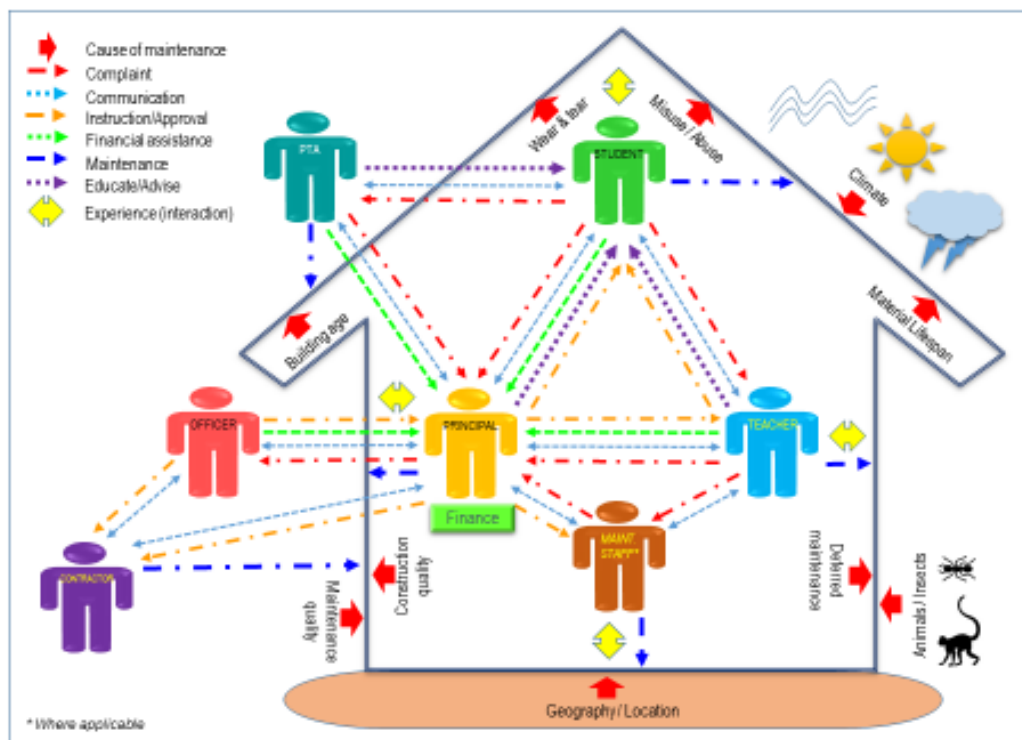
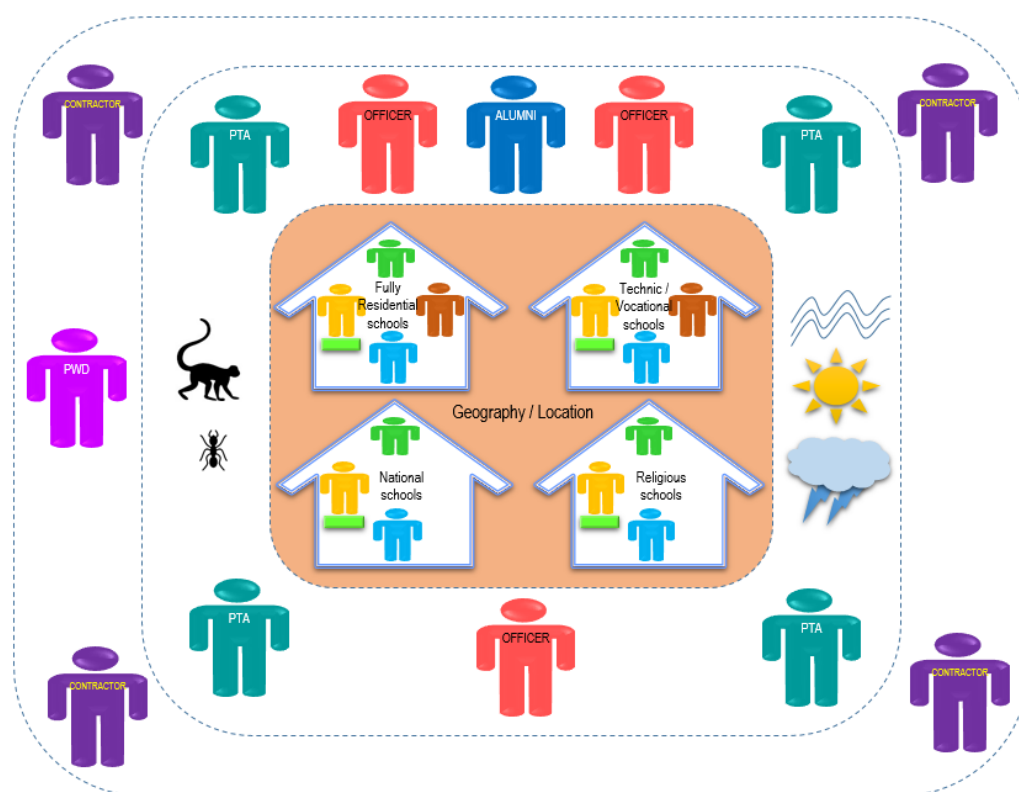


Figure 5-3: Ecological model of school building maintenance: Interaction complexity and dynamism (Individual school) drawn from the study

Essentially, the ecological perspective model as shown Figure 5-3 represents a useful theoretical framework for understanding the overall process of school building maintenance, especially the complexity, dynamism and mutual reciprocal interaction of the building and its system with various external (e.g. officers, contractors, parents) and internal stakeholders (e.g. principal, teacher, students, technical staff), multiple influential elements (e.g. finance, climate, geography, animal), key maintenance procedures (e.g. complaint, communication, instruction, financial request, implementation) and actions (e.g. wear and tear, misuse and abuse), that are involved in school building maintenance. Such an ecological model was founded on the systems theory that postulates that *‘the person and the environment as an interacting, unitary system in which each constantly affects and shapes the other’* (Illinois State Board of Education, 2008, p. 12).

This perspective is no stranger to the context of education system and has been applied by people like Bronfenbrenner (1976) who utilised it in explaining the child development and learning. In the Malaysian context, MOEM shares a

similar ecological view in its current educational blueprint implementation, by acknowledging that the greater participation of parents, community and private sector has fostered the existence of a learning ecosystem which stretches beyond the school as shown in Appendix 28 (Ministry of Education Malaysia, 2013a).



*Figure 5-4: Ecological model of school building maintenance (Various schools) drawn from the study*

Similarly, to apply the same ecological perspective of school building maintenance but into a much broader educational and social context of the current study as shown in the Figure 5-4, one can perhaps appreciate the added level of complexity and mutual-interaction between multiple layers as well as stakeholders (Johnson, 2008). From this model, on one hand, one can visualise that the building maintenance whilst is an internal matter for each individual school, would compete against each other, particularly in terms of resource allocation namely finance, as some principals pointed out. On the other hand, one could also see that despite the differences of individual school (e.g. school types, maintenance resources), there exists some common

similarities of school building maintenance practices, key challenges, implications and most importantly potential innovative solutions that could be shared between schools. It also offers some thought as to the critical importance role of each stakeholders in the school building maintenance context.

### 5.3 Summary

The current study offers multiple perspectives on the issue of school building maintenance based on various stakeholders both in schools and in the education offices that serve them. The building users are chosen as they occupy a unique position as ‘expert consultants’ who are *‘experts in their own lives and by inference, experts in their experience of places and spaces they use’* which qualifies them as the only person(s) that *‘can really know what it is like to experience a place as they do’* (Parnell, 2011, p. 9). In the current study, the principals, teacher and students bring with them their own perspectives and experiences from the inside out, while the education officers carry their views and agendas from outside (Singer and Woolner, 2015), enabling both the ‘inside out’ and ‘outside in’ opinions and experiences (Day, 1994) to be considered. Such approach of bringing together different points of view to this study, is aimed at establishing and embracing a broader understanding of the school building maintenance issue.

As previously discussed in section 5.2, school building maintenance elements – practices, challenges and effects – do not operate in isolation (Eisner, 1988; Cohen *et al.*, 2009) due to the fact that schools are part of an ecological system (Eisner, 1988). Thus, owing to the interactive nature of its component (Eisner, 1988), it is only natural to expect that the district and community (local, state, and national) within which the school operates would have some degree of influence (Cohen *et al.*, 2009). Hence, in order for any substantial changes in school to ensue, the education system needs to be viewed in its entirety as *‘an ecosystem of mutual dependence’* (Eisner, 1988, p. 29). As argued by Robinson and Aronica (2015, p. 63), *‘education is best seen not as industrial system but as an organic one’* which is complex and adaptive.

Thus, an ecological concept provide a suitable lens through which school building maintenance may be better comprehended and from which implications may be drawn. Such perspective in the context of school building maintenance would allow for the appreciation of every component that is critical and influences the building inhabitants. Cash's (1993a) early work reviewed earlier in section 2.2.2 provides a perspective of a school at the micro-level perspective. The current study offers a macro-level perspective on the subject of school building maintenance, proposing the need to adopt Eisner's (1998) model of school as part of a bigger ecosystem which appreciate the interactive dimensions of school maintenance and consequently its vital elements that make up the influences of its school building present condition as well as the experiences of its administrators and end users.

In the current context, schools singlehandedly would not be able to realise potential improvement and transformation in learning (Groves and Baumber, 2008). This is on the understanding that *'all schools operate in intricate framework or network of schools and other agencies, usually with a local government authority at their heart'* (Groves and Baumber, 2008, p. 17). This is similar in the case of Malaysia, with the exception of the federal government authority at its epicentre. While the immediate and constant support is available from the SED and MOEM in general, without concrete community engagement, the full potential of the transformation needed in school building maintenance would not be realised. It is therefore proposed that active engagement with the stakeholders within the school ecological system (school community) is essential in order to maintain an effective school building maintenance. In acknowledgement of such ecosystem, MOEM adopts such a perspective in its blueprint (Appendix 28).

The current study findings show that engagement with the stakeholders, particularly the parents and community, is not fully developed. Nevertheless, the examples of the schools in the study mentioned in section 4.6.4 give positive hope to this approach and demonstrate the existing potential of such a partnership, particularly by leveraging them as providers of alternative expertise and resources (Shaeffer, 1992), perhaps in the form of ideas, networking, material and time for improving school building maintenance. Although, it is worth remembering that there is no universal recipe for realising participatory

development as what would succeed will vary immensely across different economic, political and cultural contexts (Shaeffer, 1992). Besides this external support from the parents, what is equally important is the valuable roles of other stakeholders in the school building maintenance, namely the school principal, teacher and students. What this means is that school building maintenance is essentially everybody's business. Without each of them playing their role, the aim of sustaining a well-maintained school building is going to be challenging.

Innovative solutions are not a panacea for all schools, as there is a need to consider individual school context. Instead, a more localised solution is perhaps more practical in some situations. Nonetheless, it offers a possible solutions for those suited to their own situation. The study demonstrated some valuable examples which could be adopted by some schools in the context of their own situation as see fit. As UNESCO (2012) reminded nations there is no simple 'one- one-size-fits-all' solution, and all school clearly should follow their own unique path when incorporating these maintenance practices. Some schools have found success in using these alternatives. In closing, the current study offers schools a promising alternative not only to identify problems and implement interventions but also assess programme effectiveness. These important research findings can assist all special and general educators in making an informed decision about their school building maintenance to help in reshaping maintenance practices.

It discussing the emerging themes of this thesis the researcher tends to concur with Goodlad (1984) premise of his widely known study in 'A place called school'. To borrow some of his terms, the issues and experience of school building maintenance to some degree are similar for most schools (Goodlad, 1984). Others like Robinson and Aronica (2015, p. 256) share their views that *'the experience of education is personal but the issues are increasingly global'*. In other words, what emerged from the research findings are that not only some themes were common, but distinct differences are also evident. This implies some similarities in procedures and the way in which school building maintenance are carried out. Hence, the school building maintenance is not experienced similarly everywhere, as the schools varies considerably in many aspects, thus, no single recommendation is applicable to all schools nationwide. Nevertheless, what can be learnt is the other element of the ecosystem -

adaptability - which have been adopted in all schools in addressing their school building maintenance challenges, namely by prioritising maintenance work, finding potential resources and solutions within or outside schools.

In sum, due to the fact that the school environment is a factor which can be enhanced with ease, it is perhaps commonsense for educators to put in as much effort as possible to realise a conducive learning environment (Jensen, 2005). Apart from this being the ethical option (Jensen, 2005), the condition, adequacy and management of the school building in most cases are within the direct control of the educational authorities, and as such, enhancing school built environment represents a genuine opportunity for improving the students' experience, engagement and ultimately, performance (Buckley *et al.*, 2005).

## **Chapter 6. Conclusion**

This final chapter of the thesis summarises the study and presents its overall conclusions. In addition, it states the significance and the implications of the thesis as well as its limitations. Lastly, it concludes by offering some directions for future research that stem from the current study.

### **6.1 Summary of the study**

The mixed methods research was undertaken to explore the issue of school building maintenance current practices, key challenges and implications in Malaysia. Drawing from multiple perspectives of key stakeholders, namely education officers, principals, teachers and students, data was collected from 18 secondary schools and five agencies in Selangor and Putrajaya using survey questionnaire, semi-structured interviews, walk-through school observations including photos as well as documents review. Thus, through investigating the experiences of both administrators and end users, the research achieves the following: (a) examines the current policy, procedures and mechanism of maintenance in Malaysian secondary schools; (b) establishes the key challenges of school building maintenance in Malaysia; and (c) assesses the level of satisfaction of the administrators and end users on the school building condition and maintenance. These are summarised as follows:

In terms of current practices of maintenance of school building in Malaysia, several findings were noted. Firstly, the policy of school building maintenance was not outlined in a single document, but consisted of various general policies on building maintenance and maintenance-related official documents stated in an array of formal policy directives through government circulars, professional circulars, the national education blueprint as well as the national development plan as shown in Appendix 26. The current overarching common policy was the Safe School policy represented by the School Health, Safety and Beautification national programme, which encompassed school building maintenance as one of its element. Secondly, maintenance planning undertaken was a mixed of short-term and long-term, although the former dominates. Thirdly, the procedures of maintenance like submission of maintenance complaints, request for additional funds, prioritisation and implementation were already established



and adhered to. Fourthly, in terms of organisation, there was also some form of established committee at the school level typified by the School Health, Safety and Beautification Committee to handle maintenance matters as shown in Appendix 20A. In addition, for fully residential and technical/vocational schools, there were added support in terms of dedicated in-house personnel to handle all school building related matters including maintenance in the form of technician and assistant engineers respectively. Fifthly, the majority of maintenance funding originated from the federal government. Lastly, several maintenance innovations in schools in terms of practical solution, implementation, communication and funding were discovered.

With regards to the key challenges of school building maintenance in Malaysia, four main challenges were identified. Firstly, the urgent maintenance issues in school are electrical system, water supply, plumbing, toilet, roof and fans. Besides that, the challenge was the causes of these maintenance issues, which were perpetrated by people and natural environment. Another challenge was resource-related, namely limited maintenance funds and personnel. In addition, administrators lack knowledge and experience. Lastly, the challenge was associated with level of stakeholders' engagement.

With reference to implications of school building maintenance, several findings were noted. Firstly, in terms of the overall school building condition, regardless of their types, ages, and locations, generally the schools were rated between the 'adequate' and 'good' category. In the former case, the school buildings require some preventative maintenance while the latter only needs some minor maintenance. Secondly, the majority of respondents regardless of type were satisfied with the school building aspects like lighting, ventilation, fans, internal air quality as well as ceiling, floors, windows, doors and walls. The majority also agreed that their schools were regularly maintained, comfortable, appear pleasant, neat and clean. In addition, they also felt that there were enough teaching and learning spaces and adequate to support learning. What all these demonstrate is the fact that school building condition and its maintenance are not merely observed, but also judged by its end users.

## **6.2 Contributions and implications of the study**

Drawing from the findings of the current study, several contributions can be identified particularly in relation to knowledge, policy and practice of school building maintenance as the following sub-sections will discuss.

### **6.2.1 Knowledge**

The study makes a valuable contribution to an under-researched topic. The knowledge of school building maintenance developed here is evidence-based and drawn from practices and experiences on the ground of both administrators and end users as follows:

#### *6.2.1.1 School building condition, maintenance and education*

While previous studies have focused on school building aspects like lighting, thermal comfort, ventilation, internal air quality, noise, as vital to the learning environment, most seem to assume that this condition or aspect is constantly available without due consideration of their technical aspects like equipment which needs maintenance. The current study findings bring to the fore the critical contribution of school building maintenance - typically overshadowed in the background - towards providing these conditions via various building services and equipment, thus generating the essential conducive learning environment required in schools. Although at a cursory glance, school building maintenance appears to be merely a technical, financial or operational matter, the findings of this study have clearly demonstrated its true educational value through its vital contribution to the well-being of the end users, teaching and learning process and ultimately quality of the education in schools. Hence, building maintenance matters, and in the context of education, school building maintenance matters a lot. The findings have demonstrated that the labels of maintenance as 'Cinderella', 'not sexy', 'not attractive' and 'unproductive' activity (Seeley, 1987; Jones and Collis, 1996; Wood, 1999; Royal Institution of Chartered Surveyors, 2009b) and its neglect in research (Al-Khatam, 2003; Theunynck, 2009) as mentioned by literature in section 2.2.3 are perhaps unfair and undeserved.

#### 6.2.1.2 *School building maintenance: An ecological perspective*

Experiences drawn from the multiple perspectives have suggested an alternative ecological perspective which needs to be adopted in dealing with the issue of school building maintenance. Earlier researchers like Bronfenbrenner (1994) and others that have been utilising such approach in education, positing the young learner which is ensconced with various layers of microsystem, mesosystem, exosystem and macrosystem. The findings of this current study lends credence to the multi-layers and interactive nature of school building maintenance.

The ecological model is presented in section 5.4 to offer a more holistic overview of school building maintenance, taking into account various aspects like the school building itself with various sub-systems and components (Lstiburek and Carmody, 1994), the immediate physical environment in which the building is located including site (soil), air, weather and animals as well as both its internal and external stakeholders. All these elements are inter-related and interact with one another, thus this symbiotic relationship needs to be considered in order to address the issue of school building maintenance effectively. For instance, by carrying out maintenance work by replacing the wooden window frame with another in a termite-infested location would probably be futile. Such a perspective encourages practitioners and policy-makers to carefully consider school building maintenance issues in their entirety.

#### 6.2.1.3 *Children and school building maintenance*

The insights that were eloquently described by the young students in the study offered an insights of what it feels to be '*the unit around whom the school revolves*' (Stillman and Castle-Cleary, 1949, p. 49). The study not only demonstrated the school children's awareness of their school physical buildings in which they inhabit as noted by previous research (Maxwell, 2000), but also their awareness of what was being done by the school to their school buildings in terms of addressing maintenance.

The study also illustrated how the school building condition and maintenance was understood by the children to affect them in relation to their physical, physiological, psychological and emotional needs as human, learner and

children. Hence, such findings lend further support for the argument that the students' feedback on their current school learning condition can offer valuable information in relation to the school environment aspects and their effects on learning (Flutter, 2006). In addition, these school physical building conditions are also translated into opinions, value judgements and satisfaction. More importantly, the study illustrated their ability to convey how these conditions affect them, proving that they are capable of articulating their thoughts into a clear description of their experiences. As prior mentioned in section 5.5, the students are indeed '*experts in their experience of places and spaces they use*' (Parnell, 2011).

#### *6.2.1.4 Differences and commonalities of administrators and end users*

The findings in the current study have demonstrated that due to their different roles, perspectives and needs, there are some differences of opinions on what maintenance aspects are most important. This is exemplified by the roof and fans. However, some commonalities are evident as shown in their mutual agreement over aspects like electrical system, toilet, plumbing and water supply. It is interesting to find that there are some broad patterns that exist in what were considered important maintenance aspects, despite some differences.

#### *6.2.1.5 Roles of stakeholders in school building maintenance*

Previous studies suggest that each individual does play a role in terms of the school operations and care of its physical environment (Cohen *et al.*, 2009). The current study findings not only corroborated such an argument, but additionally presented what these key roles are for both the internal and external stakeholders in the context of school building maintenance in section 4.6.4.

### **6.2.2 Policy**

There are many policy implications that the current study can offer, but due to the space limitations, only some of the major ones would be discussed. Some cases are applicable in the Malaysian context, but general lessons could also be drawn for others involved in school building maintenance.

#### *6.2.2.1 School building maintenance training*

The study discovered the knowledge and skill gaps which existed in the context of managing the school building, in particular its maintenance. This is particularly critical for the school managers on the ground, who are entrusted with such huge responsibility. Such knowledge and skill gaps are something that cannot be left to chance, relying primarily on on the job training and accumulated experience (Kowalski, 2002). It needs to be planned for and addressed systematically. To this end, the national formal training course programme for prospective and existing principals need to be revised accordingly to include the aspect of school building maintenance. Besides technical knowledge of buildings, other vital elements like costing and planning for school building maintenance that was indicated in the current findings as important can be included by outside experts. In addition, the involvement of seasoned principals as invitational speaker in the course is also essential to share their practical experiences on managing school building maintenance.

#### *6.2.2.2 Prioritised-based approach to school building maintenance*

Despite the necessity of prioritisation due to finite budget limitations, this should not mean that only maintenance issues that affect health, safety and comfort are addressed, while others like building appearance and aesthetics are totally ignored. Based on the current study findings and corroborated by previous research (Uline and Tschannen-Moran, 2008), good appearance of the school buildings are also important in eliciting pride and other positive feelings and emotions. This, in turn, could indirectly influence learner outcomes like behaviour and performance.

### **6.2.3 Practice**

#### *6.2.3.1 Best practices and innovative ideas*

The study also offered some best practices and innovative ideas on addressing school building maintenance in terms of practical solutions, implementation, communication and alternative funding. Although they do not intend to be a perfect fit for every situation, the study findings have shown that they were effective in certain situations. Thus they offer new possibilities for others to adopt or adapt to the unique needs of school building maintenance in their respective schools. At the very least, these school building maintenance

innovations are proof that even within a centralised education system, innovations are able to flourish.

#### 6.2.3.2 *Giving voice to participants especially students*

The study provided an opportunity for both administrators and end users to voice out their opinions on their school building maintenance, which embodies the notion of democratisation of education, where the voices of all are of equal importance (Rudd *et al.*, 2006, p. 3). This is especially true for the young learners - our backyard treasures (Soohoo, 1993) - who are usually seen but rarely heard (Flutter and Rudduck, 2004), despite their learning being central to the purpose of school (Pollard, 2005). The current study enabled these '*silent voices*' (Soohoo, 1993) to be listened to and, in turn, benefited from their fresh insights. As other research has demonstrated, these may be valuable in indentifying critical issues (Flutter and Rudduck, 2004) and deciding on any necessary changes or modifications (Bean *et al.*, 2000, p. 12). This is because '*they are authentic sources*' who personally experience the classroom and '*can teach us so much about learning and learners*' (Soohoo, 1993, p. 389). After all, previous research has indicated that their views on teaching and learning were highly consistent with experts of '*learning theory, cognitive science and the sociology of work*' (Phelan *et al.*, 1992, p. 696).

### **6.3 Limitations of the study and recommendations for future research**

The study attempted to examine the current maintenance practices, key challenges and implications of school building maintenance in Malaysia. Despite attempts to enhance its validity and reliability, the study was subject to several limitations, primarily constrained by time, cost and budget factors.

The current study is limited to the states of Selangor and Putrajaya, involving 18 schools representing four types of secondary schools. Hence, future local research at a much bigger scope and scale is suggested to include more secondary and primary schools from other parts of Malaysia especially the rural areas to get a better overall view of school building maintenance nationwide. As the current research involved education officers from only five agencies, it is suggested that more officers who are involved in school buildings maintenance at other agencies are included in future studies. This could offer an enhanced

understanding on the broader network of agencies and their officers' roles in the school building maintenance.

Opportunities also abound for further international research on such an under-researched topic. Similar international research which include other developing nations from Asia and Africa is recommended, so as to offer perspectives from these nations with regards to school building maintenance in particular and school buildings research in general, which are currently dominated by the developed nations from US and Europe. Such endeavour could offer a more balanced global view on the subject for future knowledge, policy and practice.

As geographical factors like location and climatic condition are significant in school building maintenance as indicated in the current study, it is proposed that future studies include other climates in other parts of the world. This could offer an enriched understanding on the extent to which these factors significantly affect school building maintenance and sharing of potential solutions.

A joint future international research on school building maintenance is also advocated as school building maintenance is associated with a global quality education issue. Such world-wide initiative could present relevant and valuable input especially in the context of achieving '*equitable and inclusive quality education and lifelong learning for all by 2030*' as outlined by the Incheon Declaration in World Education Forum 2015 (UNESCO, 2015a).

## **6.4 Conclusion**

The current study of school building maintenance could perhaps be positioned within a general agenda of a global socio-political interest to improve the physical environment in which children learn and teachers teach (OECD, 2006; OECD, 2009; Chiles *et al.*, 2015). It is suggested that the school building maintenance issue needs to be viewed from an ecological perspective, due to its inter-related nature with the educational, social, cultural and geographical context within which it resides. What emerged from the current study are some common themes, as well as distinctive differences in school building maintenance. Inescapably, the geographical, climatic, culture and conditional differences are real, but so are the issues related to school building

maintenance, some of which are universally shared. Limited maintenance funds and aging buildings are two prime examples. Hence, irrespective of the local context, it is possible to discern a number of similarities and differences that may be of significant value for the overall general landscape of knowledge, policy and practice of school building maintenance. Despite these differences, there are still some valuable lessons to be learnt which can be adopted or adapted by educators, school leaders and policy makers anywhere to cater to the school building maintenance needs and issues in their local context.

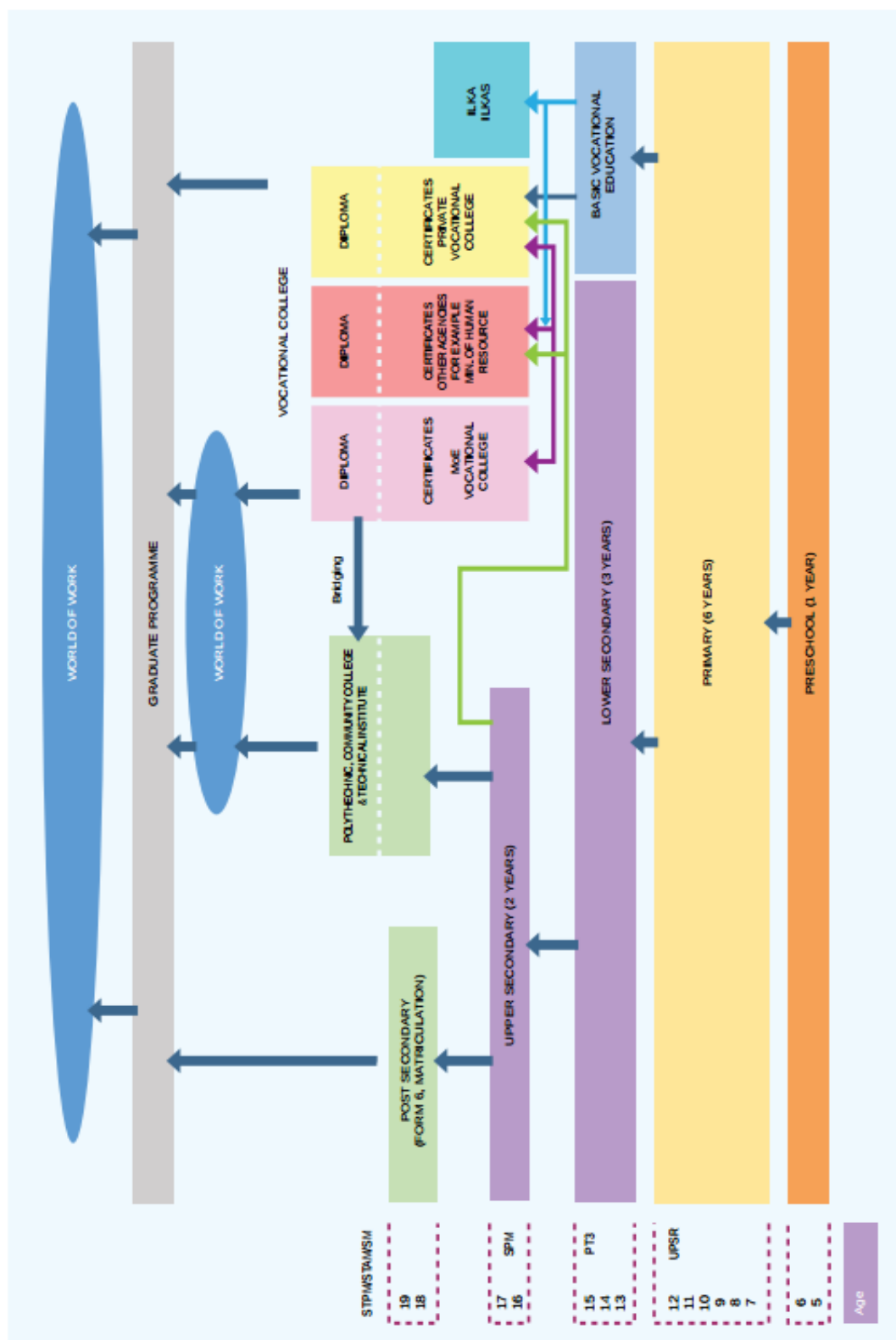


## Appendices

## Appendix 1: Malaysia Education Blueprint 2013-2025 – 11 Core Shifts (MOEM, 2012)



## Appendix 2: Overview of Malaysian Education System and Assessment (MOEM, 2015)







### Appendix 3: Guidelines and Regulations for Building Planning – Secondary School (EPU, 2015)

NO.	ASPECT	ITEM	NUMBER OF CLASSROOMS / UNITS					
			12	18	24	30	36	42
1.	Administration	1.1 Principal Room	1	1	1	1	1	1
		1.2 Assistant Principal Room	1	1	1	1	1	1
		1.3 Head of Department Room	1	1	1	1	1	1
		1.4 Teacher's Office	1	1	1	1	1	1
		1.5 Teaching Aids Room	1	1	1	1	1	1
		1.6 Main Meeting Room	1	1	1	1	1	1
		1.7 Examination Management Room	1	1	1	1	1	1
		1.8 Resource Room	1	1	1	1	1	1
		1.9 Dentistry Room	1	1	1	1	1	1
		1.10 Health Screening Room	1	1	1	1	1	1
		1.11 Guidance and Counselling Room	1	1	1	1	1	1
		1.12 School Cooperative	1	1	1	1	1	1
		1.13 Prefect Room	1	1	1	1	1	1
		1.14 Safety Room	1	1	1	1	1	1
2.	Academic	2.1 Classroom	12	18	24	30	36	42
		2.2 Prayer Room	1	1	1	1	1	1
		2.3 History and Geography Room	1	1	1	1	1	1
		2.4 Art Education Room	1	1	1	1	1	1
		2.5 Life Skills Workshop	1	1	1	1	1	1
		2.6 Home Economics Room	1	1	1	1	1	1
		2.7 Music Room	1	1	1	1	1	1
		2.8 Mathematics Room	1	1	1	1	1	1
		2.9 Language Room	1	1	1	1	1	1
		2.10 Self-Access Learning Room	1	1	1	1	1	1
		2.11 Computer Laboratory	1	1	2	2	3	3
		2.12 Science Laboratory	2	3	3	3	3	3
		2.13 Physics Laboratory	1	1	1	2	2	2
		2.14 Biology Laboratory	1	1	1	2	2	2
		2.15 Chemistry Laboratory	1	1	1	2	2	2







NO.	ASPECT	ITEM	NUMBER OF CLASSROOMS / UNITS					
			12	18	24	30	36	42
3.	Other facilities	3.1 Pupil Changing Room (Male)	1	1	1	1	1	1
		3.2 Pupil Changing Room (Female)	1	1	1	1	1	1
		3.3 Sports Management Room	1	1	1	1	1	1
		3.4 Co-Curriculum Operation Room	1	1	1	1	1	1
		3.5 Text Book Operation Room	1	1	1	1	1	1
		3.6 Multi-Purpose Space	1	1	1	1	1	1
		3.7 Canteen	1	1	1	1	1	1
4.	Optional Space	-	-	1	1	1	1	
		-	-	-	1	1	1	

## Appendix 4: Summary of Schools Profiles


School code	School profile	Photo
S01	S01 is one of the earliest vocational school established and is located in an urban area of Petaling district. The school has 30 acres of land with 14 individual buildings, half of which are workshops. These were built in early 1990s to 2000s. The oldest block is 23 years old. It is a single session school with 30 classrooms, catering to 591 students. Its teaching staff is large at 91, supported by 24 support staff.	
S02	S02 is a single session vocational school located in rural area of Klang district. Spanning a slightly smaller land area of 25 acres, the school has 16 individual school building blocks, 11 of which are school workshops. Its buildings were built in end of 1970s, 1980s and 1990s. The oldest block it has is 38 years old. With its 40 classrooms, it caters to a total of 1496 students, with a larger 111 teaching staff and 26 support personnel.	
S03	S03 is one of the oldest and established fully residential school within a 9.67 acres of land which is located in the rural area of Klang district. There are 6 separate blocks of school buildings, constructed as early as 1950s, late 1970s, 1980s and 1990s. It was originally the location of the royal palace of the State Ruler and today, the former sultan's palace still stands, which is the oldest building at 42 years old. It is a single session school with 36 classrooms catering to 806 students of form 4, 5 and 6. There are 84 teachers and 31 support staffs.	
S04	S04 is one of the oldest government aided missionary secondary school located on 8 acres of land which is situated in the urban area of Petaling district, surrounded by matured neighbourhoods. The school has 22 classroom and 7 blocks of school buildings including school hall and sports hall. Its buildings is a mixed of 1950s, 1970s and 1990s, with the oldest building aged 57 years old. It is a double session school which caters to 1410 students, the school has 55 teaching faculty members with 8 non-teaching staff.	
S05	S05 is a single session religious secondary school located on a 14 acres land in the rural area of Kuala Selangor district. The school has 13 school blocks for teaching and learning as well as administration purposes, in addition to 5 blocks of school quarters. Its buildings were built as earliest as 1994 and additional buildings constructed in 2000s, with the oldest building aged 21 years old. It has 25 classrooms for use for its 609 students, with a teaching staff of 57 and 19 staff members.	



School code	School profile	Photo
S06	S06 is a fully residential school situated on approximately 28 acres of land in a rural area of Kuala Selangor. The single session school has 27 classrooms located in 11 separate school buildings including 1 staff quarters, built mostly in 1994 with additional blocks added in 2013 and 2014. The oldest building age is 21 years old. Total school enrolment is 755, with 64 teaching staff and 22 support staff members.	
S07	S07 is a religious secondary school established in rural area of Sabak Bernam district, within nearly 20 acres of land. The single session school has 11 individual block of school buildings, mostly built in 1980, with additional 1990s and 2000s buildings. The oldest building, built in 1980 is now 35 years old. With its 41 classrooms catering to 677 students, there are 65 teachers and 16 staff members in the school.	
S08	S08 is a fully residential school situated on a 40 acres of land in rural area of Sabak Bernam, surrounded by villages and palm plantations. It has 6 individual blocks of school buildings, all of which were built in 2002, offering 30 classrooms and other facilities. The oldest block is 15 years old. There are 507 students with 54 teachers and 18 support staff members in the school.	
S09	S09 is a national secondary school located in a rural area in Kuala Langat district. Situated in 9 acres plot of land, the school has 40 classrooms with 6 buildings built mostly in 2001, with the prayer building constructed in 2012. The oldest school buildings are 14 years old. The school is organised into two sessions to accommodate its large student body of 1930, and 133 teachers and 16 staffs.	
S10	S10 is a national secondary school established in 1958 and located in the rural part of Kuala Langat on 8.53 acres of land. It has 8 blocks of school buildings ranging from as early as 1950s to 2000s. With its 33 classrooms, it caters to 1100 students, 85 teachers, operating as a double session school.	
S11	S11 is a fully residential school situated on a land parcel approximately 27 acres in a rural part of Gombak district. There are 4 blocks of school buildings which were all built in 2003, which means the oldest buildings are 12 years of old. This single session school has 24 classrooms catering to 631 students, 60 teachers and 17 staffs.	

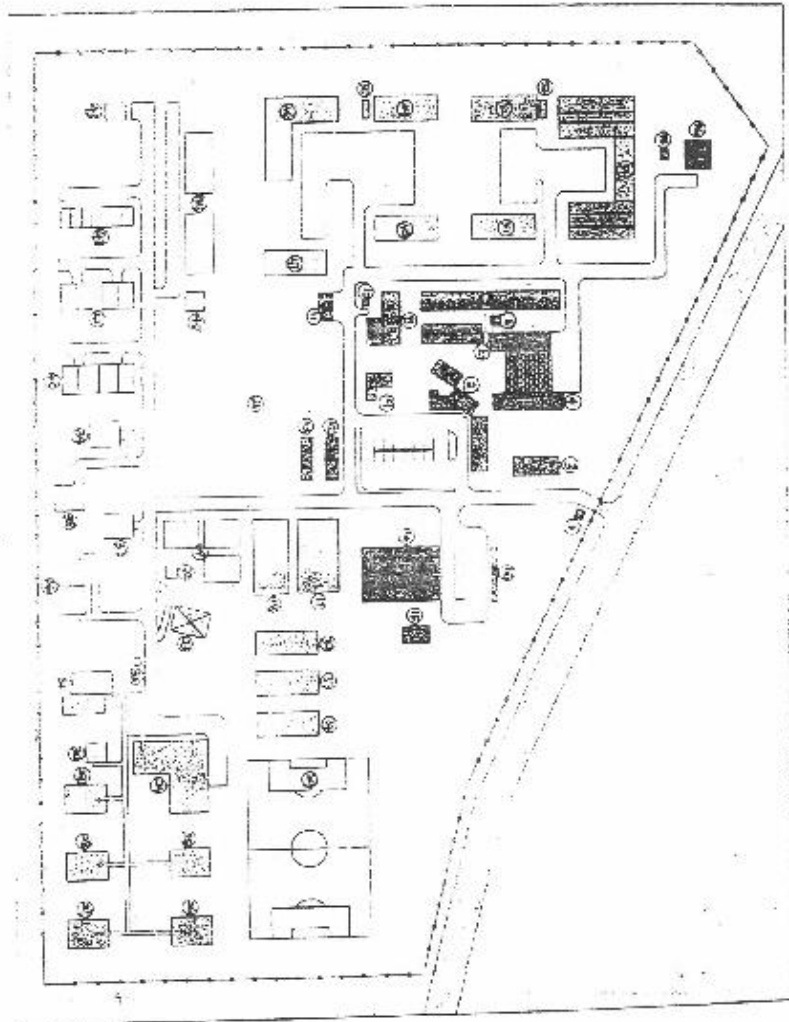
School code	School profile	Photo
S12	S12 is a vocational school constructed on a 16.8 acres parcel of urban land in district of Gombak. The school has 8 blocks individual school buildings, 7 of which were constructed in 1999 while the other one which was a computer laboratory was built in 2006. The oldest buildings are 16 years old. The single session school has 30 classrooms, which caters to the needs of 482 students, and taught by 78 teachers and supported by 25 staff members.	
S13	S13 is a vocational school built on 38 acres of urban high ground land in Hulu Langat district. It has 21 separate buildings, 14 of which were built in 1991. Other additional buildings were built in 1994, 2003 and 2012. The school oldest buildings are 24 years old. The single session school has 21 classrooms with an enrolment of 849 students, in addition to 96 teachers and 23 staff members.	
S14	S14 is a single session religious secondary school in rural area of Hulu Langat. Built on a 30 acres of land, the school consists of a mixed of 11 individual buildings from 1970s, 1980s, 1990s and 2000s. The school oldest buildings are 38 years old. It has 32 classrooms for its 1027 students, together with 75 teachers and 17 staff members.	
S15	S15 is a national secondary school situated in a rural part of Sepang district spanning an area of 12 acres. The school has 7 blocks of buildings built in 1970s, 1980s, 1990s and 2000s. The oldest buildings are 45 years old. It has only 33 classrooms. Thus, to cater for its large number of student population of 1492, with 111 teachers and 18 staffs, the school operates a double session (morning and afternoon).	
S16	S16 is a vocational school in a rural part of Sepang district. Covering an area of 42 acres, the single session school has a total of 7 school buildings with 36 classrooms. 6 were built in 2004, with an additional prayer building constructed in 2005. The buildings are now mostly 15 years old, catering to 291 students, 75 teachers and 20 staffs.	
S17	S17 is a national secondary school located in rural area of Hulu Selangor district on a piece of 20 acres land. It has 9 school blocks which are consisted of 1960s, 1980s, 1990s and 2000s buildings. The oldest buildings is 44 years old. The single session school currently has 755 students, 58 teachers and 10 staffs.	



School code	School profile	Photo
S18	<p>S18 is a fully residential school located in another rural part of Hulu Selangor on a huge plot of land totalling 60 acres. There are 10 individual buildings, 9 of which were built in 2000 and another one constructed in 2011. The oldest buildings are 15 years old. This single session school has 26 classrooms, catering to 800 students, 68 teachers and 22 support staffs.</p>	

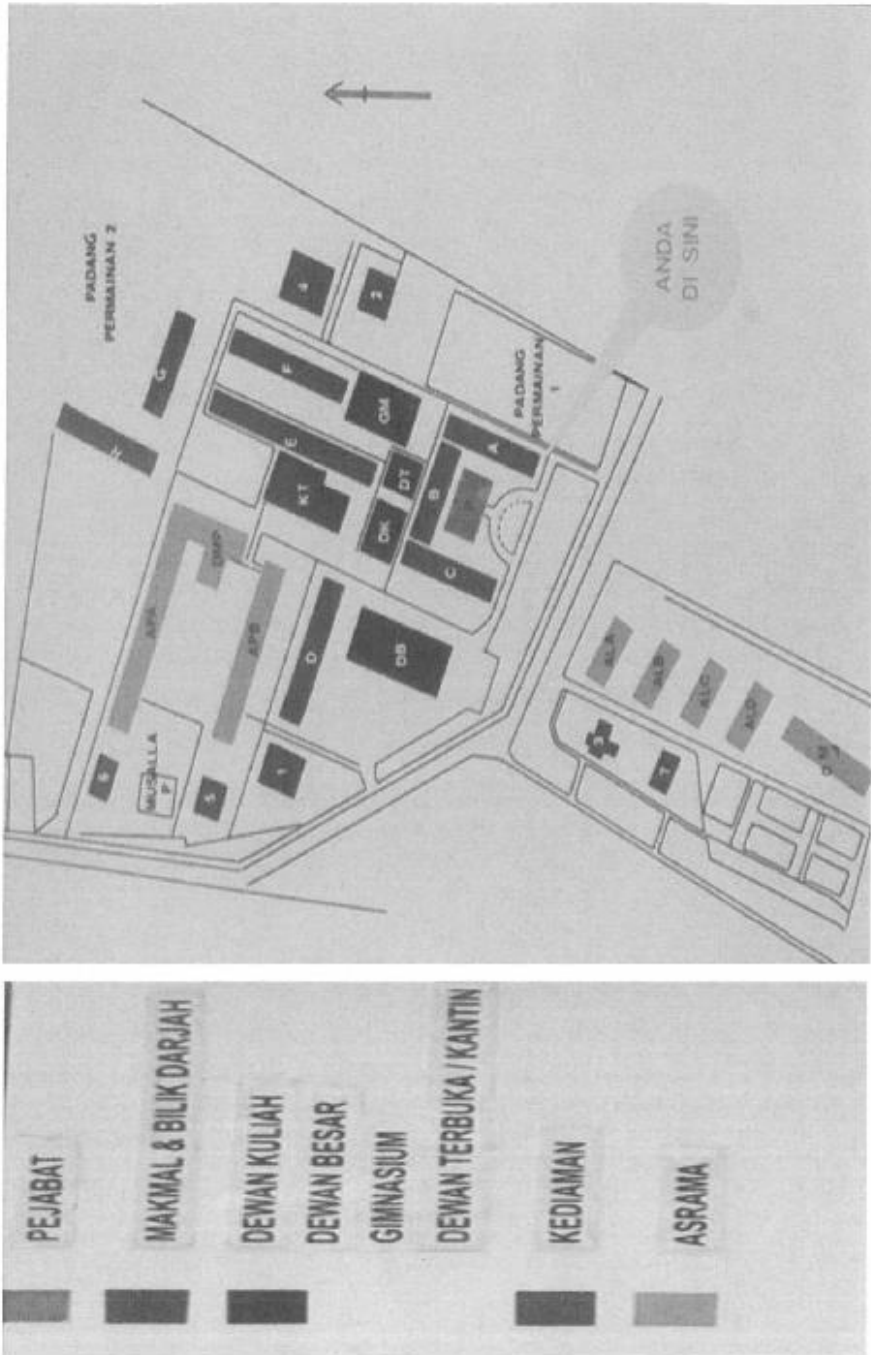
## Appendix 5: School Lay Out Plan (S01-S18)

### Appendix 5A: S01



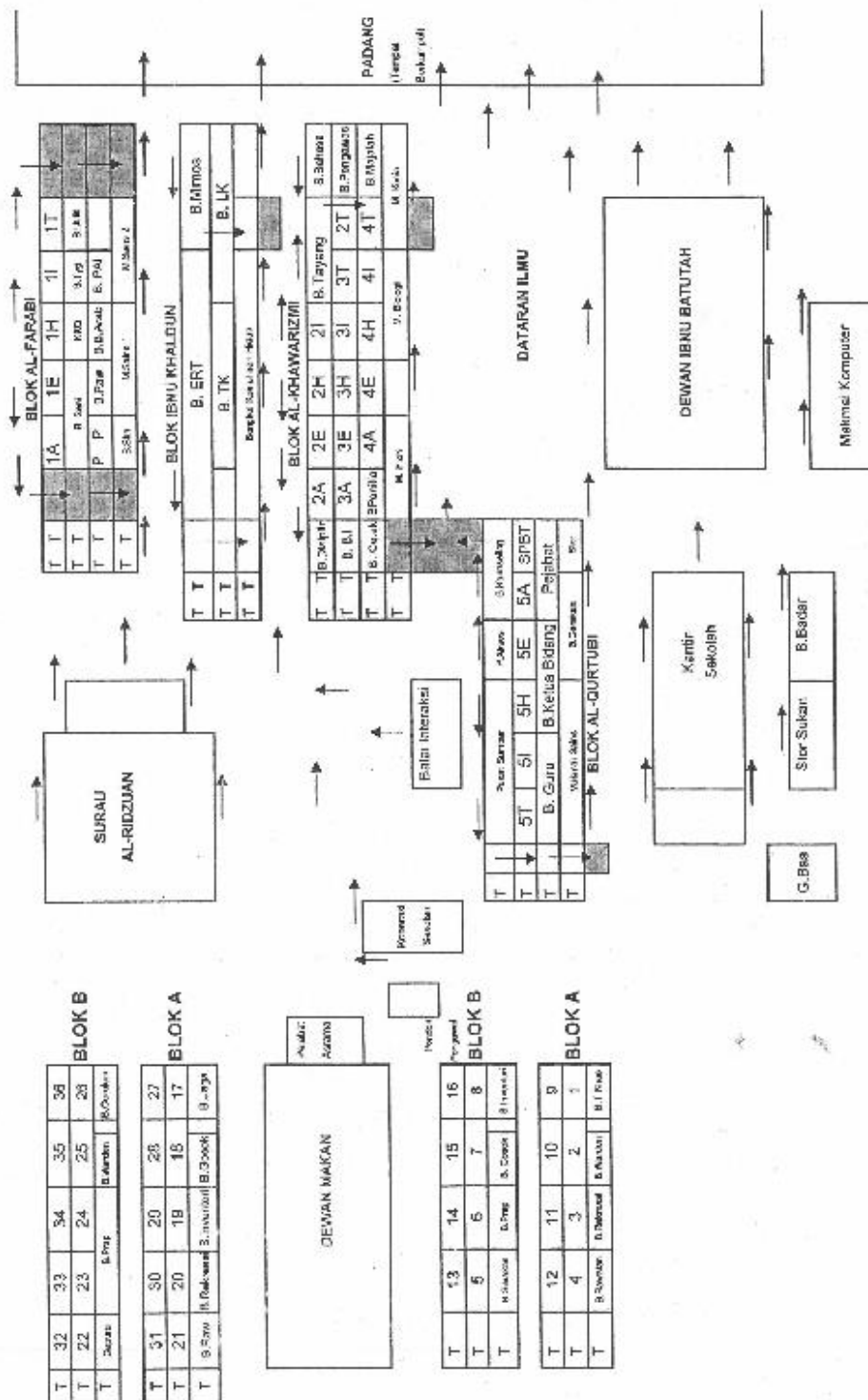
No.	Particulars
1	Principal's Office
2	Deputy Principal's Office
3	Headmaster's Office
4	Headmistress's Office
5	Head of House Office
6	Head of House Office
7	Head of House Office
8	Head of House Office
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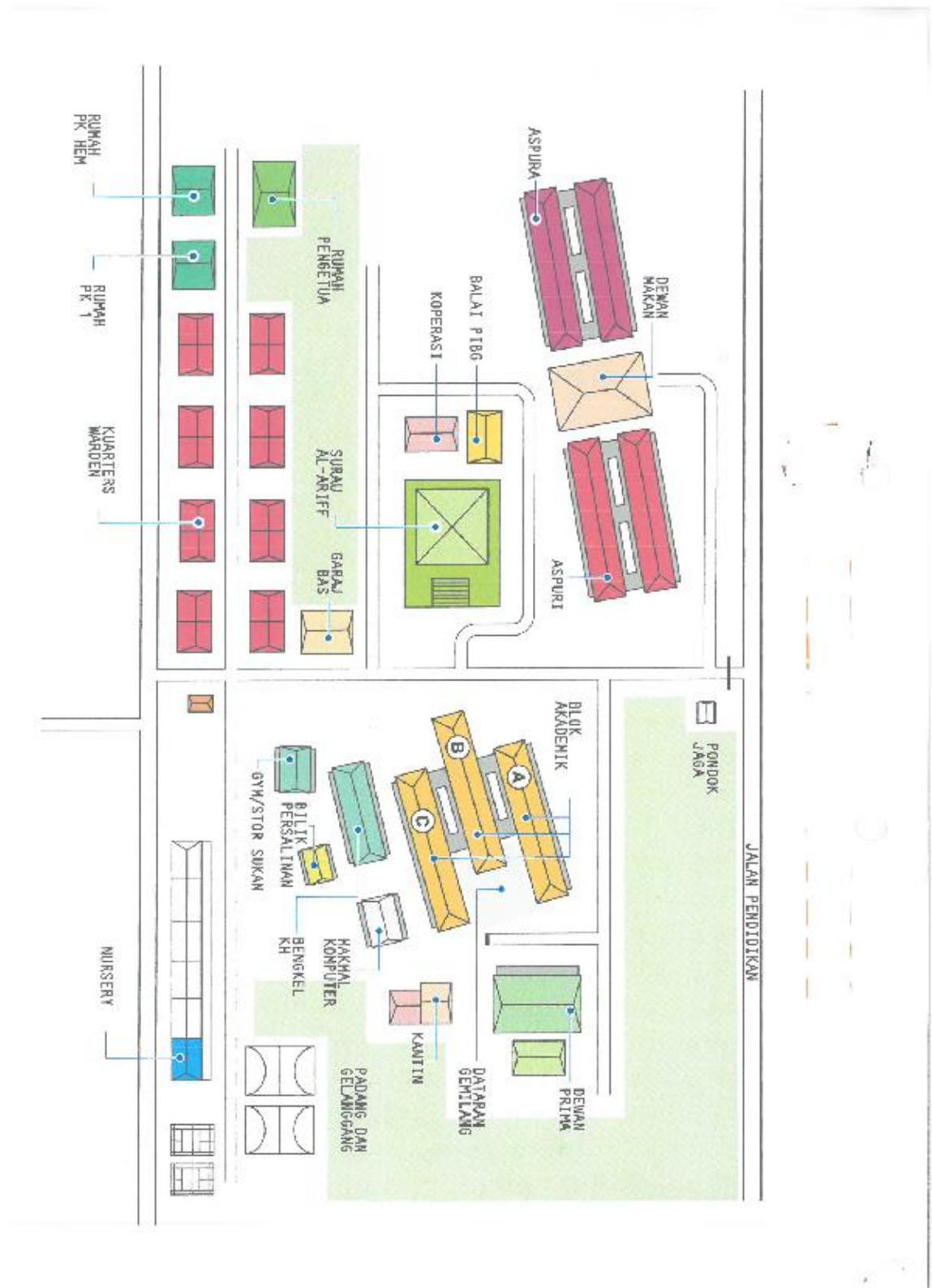




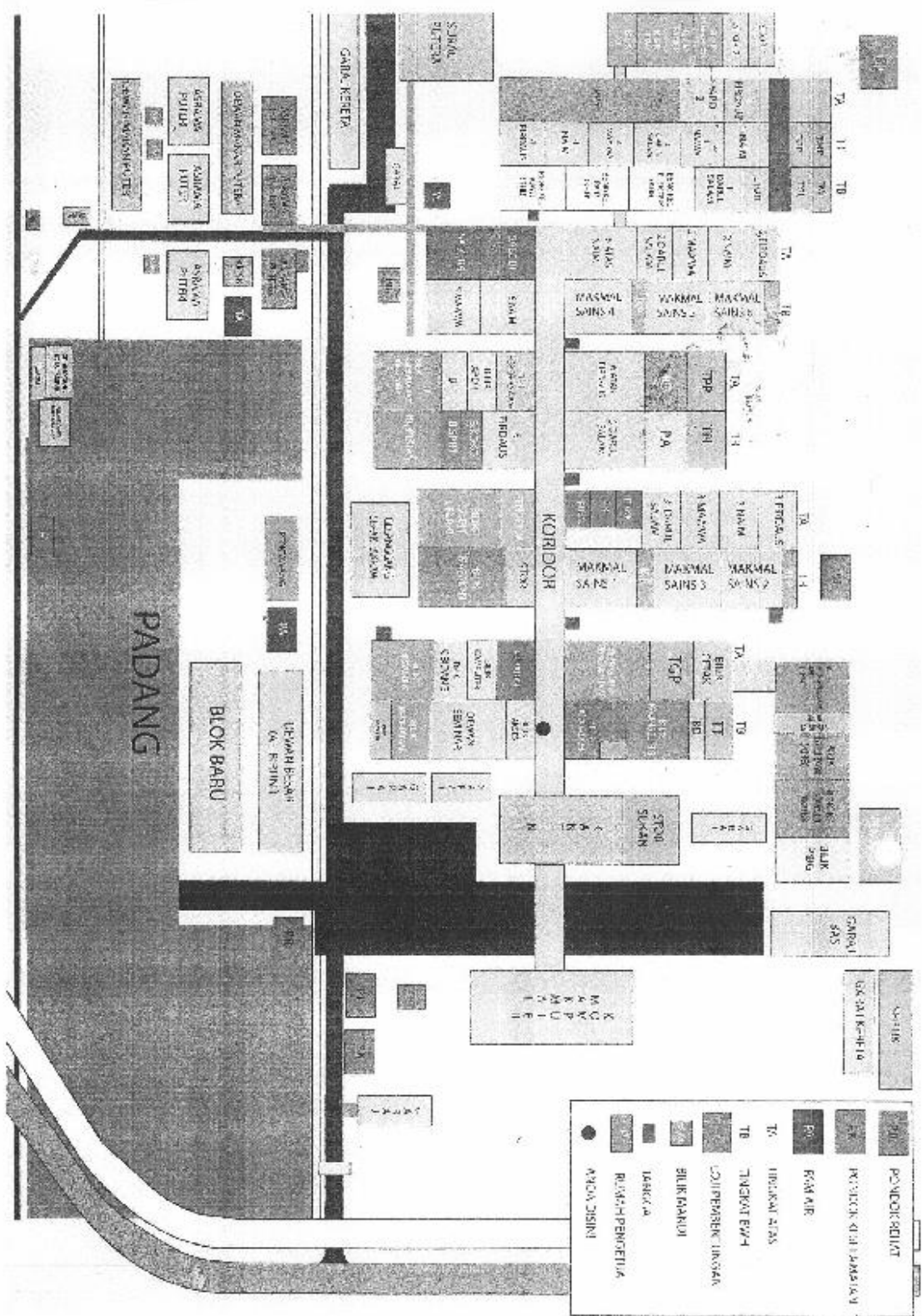
# Appendix 5E: S05



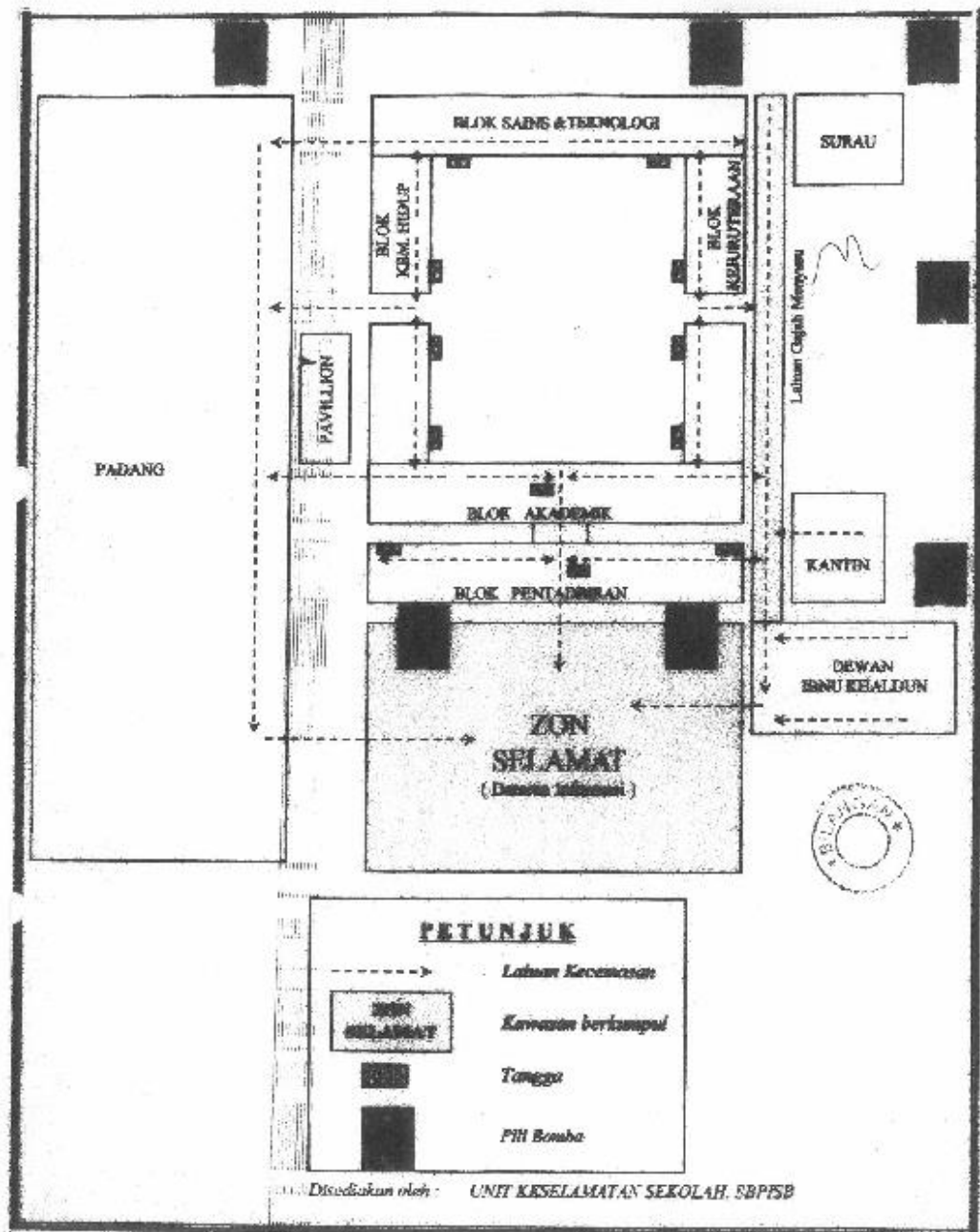
# Appendix 5F: S06



## Appendix 5G: S07









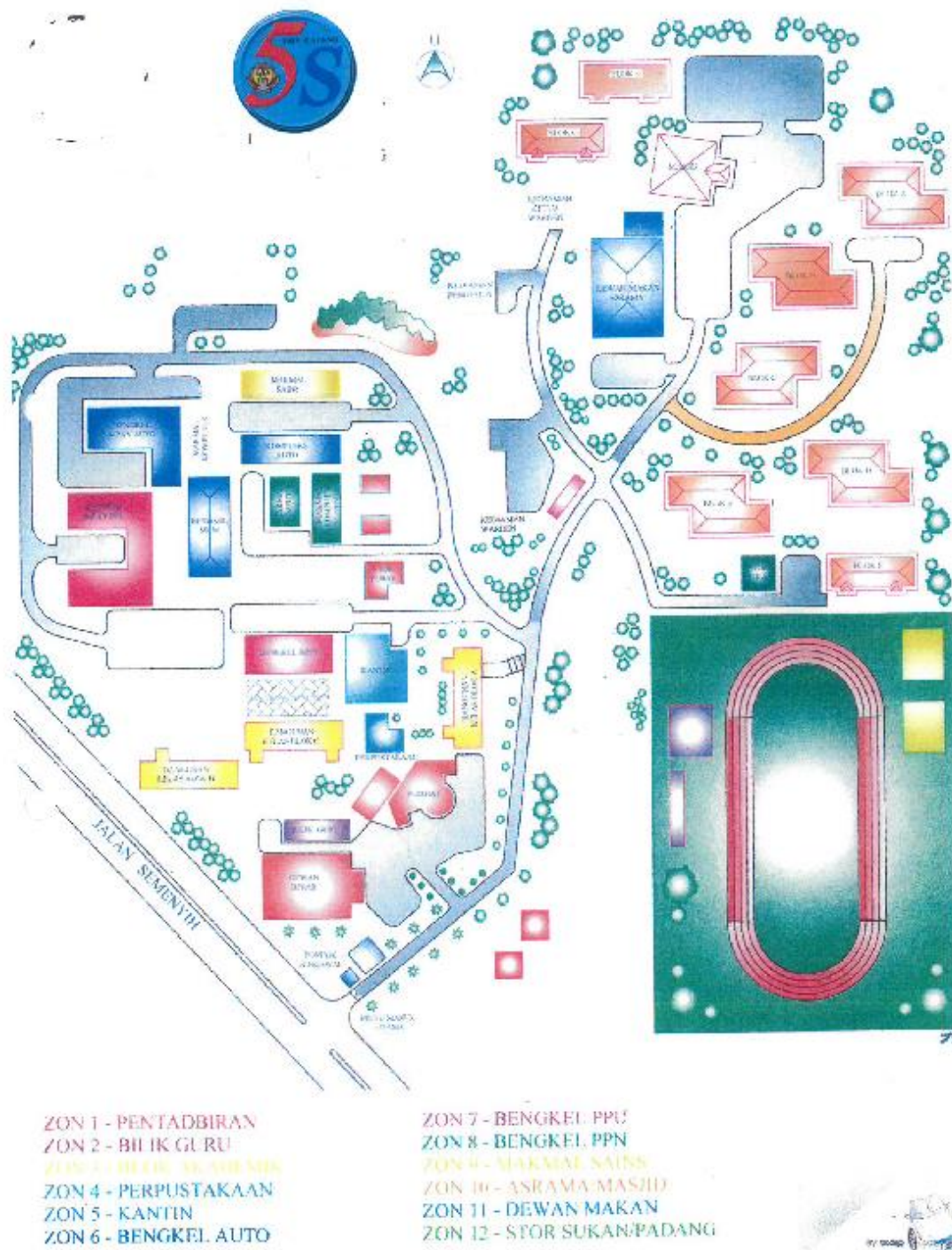
[illegible]

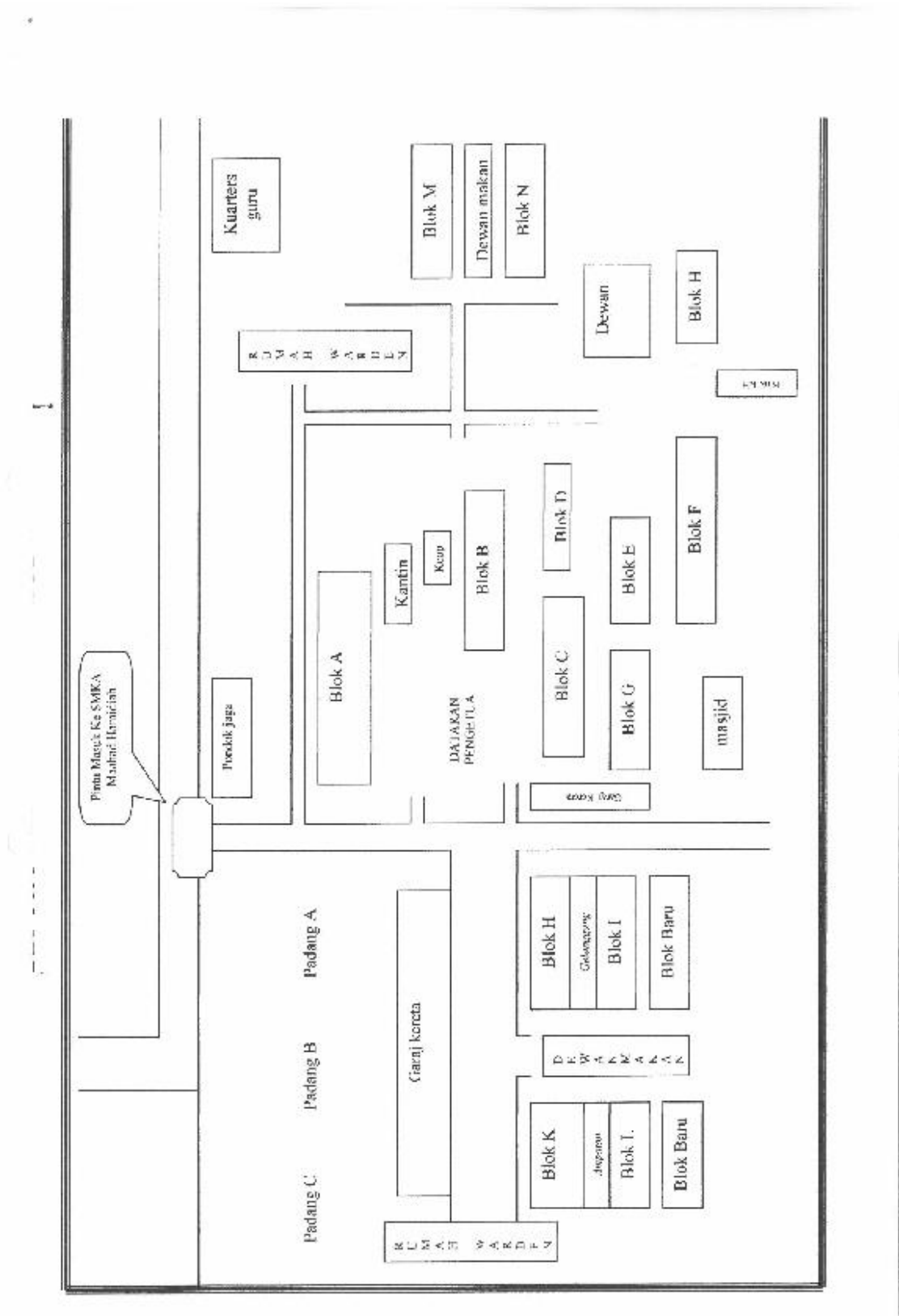


# Appendix 5L: S12

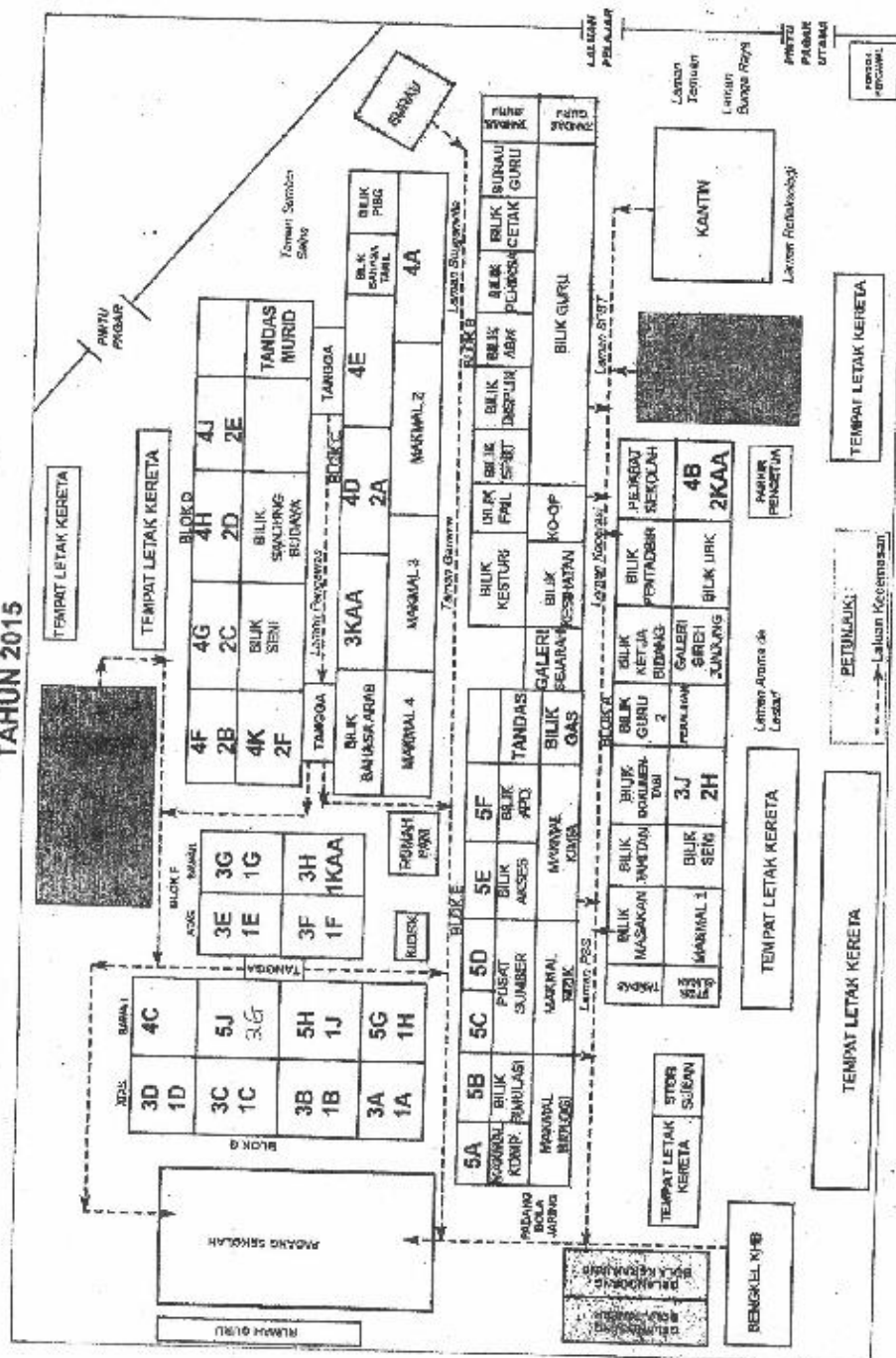


Appendix 5M: S13





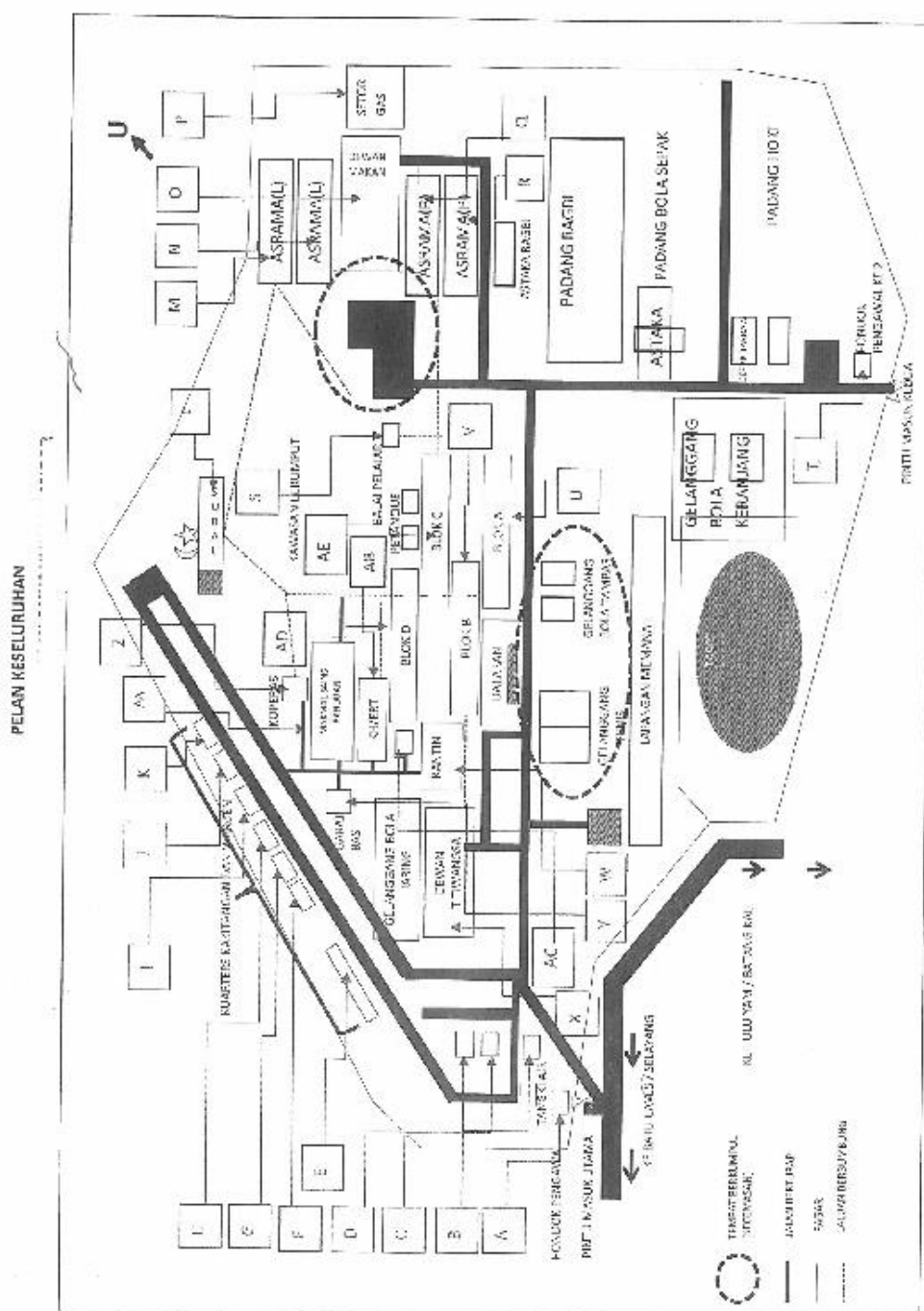








$$\frac{2}{5} \Delta$$

## Appendix 6: Summary of Agencies

Agency code	Agency profile
A1	The department was established in 1963 as the main agency in charge of the overall planning of the national education. Among others, this includes the school physical development, including the school building maintenance. Another role of the department is to provide various inputs to assist the policy decision makers in the development of national education policies. Headed by a Director with two Deputy Directors, its office is located in the Federal Territory of Putrajaya.
A2	This department was established under the Education ordinance 1950. It started its operation in 1955 with its main responsibility as MOEM's representative to coordinate all matters related to the management and administration of all schools, both primary and secondary, in the state. Headed by a Director and Deputy Director, there are ten sectors under the department, spearheaded by each Sector Head. Its office is situated in Shah Alam.
A3	The department was established in August 1995 as a unit that is placed under the Schools Division, to provide assistance to the religious schools and the management of new religious teachers. In 1973, the department was upgraded to its own Division, headed by a Director and two Deputy Directors. It is currently located in Cyberjaya.
A4	Originally, it is only one unit of the under the Schools division. However, since 2008, in line with the restructuring of MOEM, it was upgraded and became a department on its own right. Its primary responsibility involved the management and administration of fully residential school and excellent schools programme. The department is spearheaded by a Director and two deputy Directors, with its office currently located in Cyberjaya.
A5	The department was established in 1964, with the primary role of ensuring the implementation and progress of technical and vocational education in the country. The scope of the duty currently includes the management and administration of the technical and vocational secondary schools across the country. Headed by a Director and three Deputy Directors, its main headquarter is located in the Federal Territory of Putrajaya.



## Appendix 7: Summary of Interviewees' Profiles

Respondent type	Number of respondent	Code	Gender	Pseudonym	Interviewee profile
Officers n=5	1	A1O02	Male	James	James is a 47 years old male Malay/Bumiputera officer. He holds a master degree and is currently a Head unit of planning for less than 6 years in A1 department. He has served the current department for 7 years and the education service for 15 years. Previously attached with a department in charge of all development projects for 4 years, James has an extensive knowledge and experience in managing and planning of a multitude of physical development projects nationwide. The number of schools under his indirect supervision are 10,132.
	1	A2O01	Male	Kenny	A 56 years old male officer in A2 department, Kenny is of Malay/Bumiputera descent. With the job title of Senior Assistant Director, he is the Head unit of development for less than six years. He has been in the department for the past 12 years and has been with the education sector for 34 years. Highly experienced with a wide array of physical development projects including maintenance around the state, he has a total of 930 schools under his control.
	1	A3O01	Male	Larry	Larry, a Malay/Bumiputera officer in A3 department, is a 40 years old man. He holds a Master degree and is currently the Head of development unit in the department for the past 5 years. He has worked for the department for 5 years in the handling matters pertaining to all physical development projects including maintenance. He has been in service in the educational sector for 11 years. The number of schools under his supervision are 273.
	1	A4O02	Male	Mark	Mark, holds a Master degree and is currently the Head of development unit in A4 department for the last 2 years. A 40 years old male Malay/Bumiputera officer, Mark has been in the department for 8 years and the educational service for 12 years. He possesses an in depth knowledge and work experience of managing a variety of physical development projects. This stems from having had the opportunity to oversee a total of 89 schools nationwide under his supervision.
	1	A5O03	Male	Neil	Neil is a 46 years old male Malay/Bumiputera with the post of Assistant Director in A5 department. He has a masters degree and worked in the educational field for 22 years, of which 4 years being in the current post and department. Throughout the years at the department, he has overseen and manage various physical development and maintenance projects of the 89 schools under his department's care.

Respondent type	Number of respondent	Code	Gender	Pseudonym	Interviewee profile
Principals n=9	1	S01P01	Male	Anderson	Anderson is a 47 years old Malay/Bumiputera principal who has recently been posted to S01 school for less than a year. Before this, he has been with the A3 department for the 5 years, and involved with a wide array of physical development projects. Graduated with a degree, he has served the Ministry for the last 23 years. He manages one of the pioneer vocational school with 591 students under his care. Located in an urban area, the school presently has 91 teaching staff and 24 support staff.
	1	S03P01	Male	Benedict	Aged 48 years old, Benedict, who is now a principal at S03 school, has been in the service for 24 years. Of Malay/Bumiputera descent, he has become a school principal for around 5 years and S03 is his second school in such capacity. Currently he has been managing this fully residential school for the past 2 year, which is situated in an urban area. There are 84 teaching staff and 808 students under his supervision.
	1	S05P01	Female	Irene	Irene is a 58 years old Malay/Bumiputera female principal with a degree. She has been at the current post for less than 8 years at S05 school. She has held the position of principal for less than 10 years and in service for around 27 years. The S05 school under her leadership is a religious secondary school located in a rural area. Under her supervision, this school currently has 57 teachers and 808 students.
	1	S06P01	Male	Cameron	Graduated with a masters degree, Cameron is a 53 years old Malay/Bumiputera male principal at S06 school. He is a new principal as he has been at the current post for only 6 months. This is his first school under such capacity although he has been in the educational service for the past 24 years. He currently manages a fully residential school located in an urban area. At present, the number of students under his care is 755 with 84 teaching staff members.
	1	S07P01	Male	Dominic	Dominic, a 57 years old Malay/Bumiputera male principal with a degree holder, has only been a principal and school for one and a half year. However, he has been in the educational service between 21 and 25 years. He also has previously worked at the state education department for around 7 years, with extensive experience in physical development projects. He manages S07 school which is a religious school located in a rural area with current students recorded at 677 with 65 teaching staff members.

Respondent type	Number of respondent	Code	Gender	Pseudonym	Interviewee profile
Principals n=9	1	S09P01	Female	Elizabeth	Elizabeth is a 59 years old Malay/Bumiputera female principal. She has been at her current position and school for the past 3 years. Her years of educational service is now at 30 years. Holding a master degree, she manages school S09, which is a national secondary school located in rural area. Having managed several secondary schools previously, she is a very experienced principal. The school presently has 1930 students, with 133 teachers and 16 support staff.
	1	S10P01	Female	Felicia	Felicia is a 50 years old Malay/Bumiputera female principal in S10, a national secondary school located in the rural area. Graduated with a bachelor degree, she manages school S10 for 6 months now. Although she is new to the post, her educational service spans between 21 and 25 years. Her previous experience include holding the post of an education officer at the District Education Office. At present, the school under her supervision has 1100 students and supported by 85 teachers.
	1	S14P01	Female	Gabriella	Age 55 above years old, Gabriella has been the principal in S14 school for less than 5 years. She is one Malay/Bumiputera principal from the highly-regarded Excellent Principal scheme. She is veteran principal due to her experience of being a principal for nearly 15 years in many schools as well as her educational service of more than 26 years. She currently manages a religious secondary school located in the urban area. Supported by 75 teachers and 17 staffs, the school currently has 1027 students enrolled from form 1 to form 6.
Teachers n=8	1	S16P01	Male	Harrison	Harrison, a 58 years old Malay/Bumiputera male Assistant Principal in S16 school, has a master degree and helps manages S16 school for less than 5 years. He has been in the educational profession for 35 years now. The current vocational school that he co-manages is located in the rural area. The single session school now has 291 students, 75 teachers and 20 staffs.
	1	S01T08	Male	Abraham	Abraham is a 48 years old Malay/Bumiputera teacher who has been in the current S01 school for 16 years and in the teaching service between 21 and 25 years. He teaches Malay language in a technical/vocational school which is located in the urban area. He is the Audit and Monitoring Coordination Head, Quality Assurance Department in school and are directly involved in development activities in the school.

Respondent type	Number of respondent	Code	Gender	Pseudonym	Interviewee profile	
Teachers n=8	1	S03T03	Male	Benjamin	Aged 48 years old, Benjamin is a Malay/Bumiputera Senior Assistant in S03 school for less than 5 years. A degree holder, he teaches Islamic law and has served the government between 21 and 25 years. Being a Senior Assistant in a fully residential school located in the urban area, he is involved mainly in the development and maintenance of the school.	
	1	S06T07	Male	Callahan	Callahan, 50 years old Malay/Bumiputera teacher, is one of the Head of Department in S06 school. He teaches the subject of Integrated Life Skills. He has been in the educational service for 25 years, 15 of which is in this school. He is directly involved in the development and maintenance works in this fully residential school located in an urban area.	
	1	S07T08	Male	Desmond	27 years old Malay/Bumiputera Desmond teaches English language (MUET) for the Sixth Form. A UK degree holder, he is a newly appointed teacher in S07 school. This rural religious secondary school is his first posting. He has been in the school for almost a year now. Designated as the school asset officer, his responsibilities include overseeing the school building physical condition and its maintenance.	
	1	S09T04	Male	Emmanuel	Emmanuel, a 49 years old Malay/Bumiputera degree holder, teaches Agricultural Science in S09 school, which is rural national secondary school. He has been in the service for nearly 25 years, 15 of which was spent in this school. He has been awarded as an Excellent Teacher throughout his service. His involvement in the development and maintenance of this school is as the secretary of the school maintenance committee.	
	1	S10T08	Male	Ferdinand	49 years old Ferdinand is a Senior Assistant who teaches Islamic Studies in this national secondary school. It is located in the rural area. Being in the educational service for 23 years, 11 of which is at this school, this Malay/Bumiputera educator is involved directly in the development and maintenance of the school.	
	1	S14T07	Female	Georgina	One of the selected Excellent Teacher, Georgina is a 53 years old Malay/Bumiputera. She is a Master degree holder, who teaches Additional Mathematics in S14 school. S14 is a religious secondary school in an urban area. She has been teaching at this school for 23 years now. She is not involved directly in any of the development and maintenance matters of the school.	



Respondent type	Number of respondent	Code	Gender	Pseudonym	Interviewee profile
	1	S16T03	Male	Hamilton	A 40 years old Malay/Bumiputera teacher, Hamilton teaches the subject of Refrigeration and Air Conditioning in S16 school for the past 7 years now. He has been teaching for 23 years and holds a master degree in the subject area. He is currently an asset officer in this vocational school, located in the rural areas. His students, under his guidance and supervision, assist in the maintenance of air conditioners throughout the school.
Students (Group of 6) n=48	6	S01	Male	Adam	The group consists of 3 Malay/Bumiputera boys and 3 Malay/Bumiputera Malay girls. All of them are at the same age of 16 years old. They are currently studying in a vocational school (S01), undergoing their first year in their Diploma course. All of them only have been in the school for 3 months.
			Male	Alan	
			Male	Alex	
			Female	Anna	
			Female	Amy	
			Female	Aisha	
	6	S03	Male	Bryan	The 3 Malay/Bumiputera boys and 3 Malay/Bumiputera girls from S03 school are in Form 4. All of them are 16 years old. They have been studying at this fully residential school for 1 ½ year.
			Male	Brad	
			Male	Ben	
			Female	Bella	
			Female	Brooke	
			Female	Beth	
	6	S06	Male	Carl	The S06 school group has 5 Malay/Bumiputera students and 1 Indian student. They are around 16 years old. They are all Form 4 students from a fully residential school. They have been studying in this school for the past 3 ½ years.
			Male	Chris	
			Male	Calvin	
			Female	Caitlin	
			Female	Carla	
			Female	Cathy	
	6	S07	Male	Dave	The group from S07 school, which is a religious school, consists of 3 Malay/Bumiputera boys and 3 Malay/Bumiputera girls. All of them are in the same Form 4 class. They are around 16 years old and have been in the current school for 3 ½ years.
			Male	Doug	
			Male	Dylan	
			Female	Daisy	
			Female	Daphne	

Respondent type	Number of respondent	Code	Gender	Pseudonym	Interviewee profile
Students (Group of 6) n=48	6	S09	Female	Diana	The group from S09, which is a national secondary school, comprise of 3 boys and 3 girls. They are all around 16 years old. These all Malay/Bumiputera students are in Form 4 and have been studying in the school between 1 and 3 ½ years.
			Male	Eric	
			Male	Evan	
			Male	Ethan	
			Female	Eve	
			Female	Eliza	
	6	S10	Female	Emma	The group consists of 3 boys and 3 girls. They are 4 Malay/Bumiputera students and 2 Indian students in this group. Aged around 16 years old, they are in Form 4 of this national secondary school. In terms of length at the current school, it ranges between less than 1 and 3 ½ years.
			Male	Felix	
			Male	Frank	
			Male	Fred	
			Female	Fiona	
			Female	Faye	
	6	S14	Female	Frieda	The 3 boys and 3 girls of a religious school (S14) are of Malay/Bumiputera descent. Studying in Form 4, they are the same age of 16. Collectively, they have been studying in this school from 1 to 3 ½ years.
			Male	Gary	
			Male	George	
			Male	Greg	
			Female	Gemma	
			Female	Gwen	
	6	S16	Female	Gloria	This group of 5 boys and 1 girl studying in a vocational school are all Malay/Bumiputera. They are in their second year at the school, with age around 17 years old. They have been studying in this school for 1 ½ years.
			Male	Hank	
			Male	Harry	
			Male	Hugh	
			Male	Howe	
			Male	Harvey	
			Female	Heidi	

## Appendix 8: Approval Letter

### Appendix 8A: EPU



**UNIT PERANCANG EKONOMI**  
**Economic Planning Unit**  
Jabatan Perdana Menteri  
Prime Minister's Department  
Block B5 & B6  
Pusat Pentadbiran Kerajaan Persekutuan  
62502 PUTRAJAYA  
MALAYSIA



Telefon : 603-8000 8000

**ABD KHALIK KHASSUNAH BIN MUZIR**  
4 Curtis Road  
NE4 9BH  
Email: bkx7173@gmail.com

Ruj. Tuan:  
Your Ref.:

Ruj. Kami: UPE 40/200/19/3180  
Our Ref.: (8)

Tarikh: 6 January 2015  
Date:

#### APPLICATION TO CONDUCT RESEARCH IN MALAYSIA

With reference to your application, I am pleased to inform you that your application to conduct research in Malaysia has been approved by the **Research Promotion and Co-Ordination Committee, Economic Planning Unit, Prime Minister's Department**. The details of the approval are as follows:

Researcher's name	:	ABD KHALIK KHASSUNAH BIN MUZIR
Passport No./ I.C No	:	711220-10-6511
Nationality	:	MALAYSIA
Title of Research	:	"SCHOOL BUILDING MAINTENANCE PLANNING IN MALAYSIA: CURRENT PRACTICE AND IMPLICATIONS TO END USERS"
Period of Research Approved	:	3 MONTHS

2. Please collect your Research Pass in person from the Economic Planning Unit, Prime Minister's Department, Parcel B, Level 4 Block B5, Federal Government Administrative Centre, 62502 Putrajaya, Malaysia. Bring along **two (2) colour passport size photographs**. Kindly, **get an appointment date from us before you come to collect your research pass**.

"Merancang Ke Arah Kecemerlangan"

3. I would like to draw your attention to the undertaking signed by you that you will submit without cost to the Economic Planning Unit the following documents:

- a) A brief summary of your research findings on completion of your research and before you leave Malaysia; and
- b) Three (3) copies of your final dissertation/publication.

4. However, you are required to avoid using samples from exam classes.

5. Lastly, please submit a copy of your preliminary and final report directly to the State Government where you carried out your research. Thank you.

Yours sincerely,

  
(MUNIRAH BT. ABD MANAN)  
For Director General,  
Economic Planning Unit.  
E-mail: [munirah@epu.gov.my](mailto:munirah@epu.gov.my)  
Tel : 03 88882809  
Fax: 03 88883798

#### ATTENTION

This letter is only to inform you the status of your application and cannot be used as a research pass.

## Appendix 8B : EPRD to EPU



BAHAGIAN PERANCANGAN DAN PENYELIDIKAN DASAR PENDIDIKAN  
KEMENTERIAN PENDIDIKAN MALAYSIA  
ARAS 1-4, BLOK E-8  
KOMPLEKS KERAJAAN PARCEL E  
PUSAT Pentadbiran Kerajaan Persekutuan  
62604 PUTRAJAYA.

Telefon: 03-88846591  
Faks : 03-88846579

Ruj. Kami : KP(BPPDP)603/011/Jld15(18)  
Tarikh : 22 Disember 2014

Ketua Pengarah  
Seksyen Ekonomi Makro  
Unit Perancangan Ekonomi  
Jabatan Perdana Menteri  
Blok B5 Aras 4  
Kompleks Jabatan Perdana Menteri  
Pusat Pentadbiran Kerajaan Persekutuan  
62502 PUTRAJAYA  
(u.p. Pn. Munirah Bt. Abd. Manan)

Puan,

**Pemohonan Untuk Menjalankan Penyelidikan di Malaysia**  
**Nama: ABD KHALIK KHAUSSUNAH BIN MUZIR**

Dengan hormatnya saya merujuk kepada perkara di atas.

2. Adalah saya arahkan memaklumkan bahawa Bahagian ini tidak mempunyai apa-apa halangan dan menyokong cadangan yang dikemukakan oleh penyelidik berkenaan untuk menjalankan penyelidikan dengan syarat tidak menggunakan sampel pelajar kelas peperiksaan:


**" School Building Maintenance Planning In Malaysia: Current Practice And Implications to End Users "**

3. Bersama-sama ini disertakan ulasan Bahagian ini ke atas cadangan penyelidikan yang dikemukakan.

Sekian dimaklumkan, terima kasih.

**" BERKHIDMAT UNTUK NEGARA "**

Saya yang menurut perintah,

  
(DR. HJ. ZABANI BIN DARUS)  
Ketua Sektor  
Sektor Penyelidikan Dan Penilaian  
Bahagian Perancangan dan Penyelidikan Dasar Pendidikan  
b.p. Ketua Setiausaha  
Kementerian Pendidikan Malaysia

## Appendix 9: Approval from Newcastle University Ethics Panel

Wendy Davison  
Thu 26/02/2015 16:28

**To:** Abd Muzir (PGR);  
**Cc:** Pamela Woolner; Frances Cook;  
You replied on 02/03/2015 14:58.

Dear Khalik

Thank you for your application for ethical approval of your project "School Buildings maintenance Planning in Malaysia: Current Practice and Implications to End Users". I confirm that Prof Daniel Zizzo has approved it on behalf of the Faculty of Humanities and Social Sciences Ethics Committee.

Please note that this approval applies to the project protocol as stated in your application - if any amendments are made to this during the course of the project, please submit the revisions to the Ethics Committee in order for them to be reviewed and approved.

Kind regards,

Wendy

Wendy Davison  
PA to Daniel Zizzo (Dean of Research and Innovation)  
Lorna Taylor (Faculty Research Manager)  
and Sue Mitchell (Research Funding Development Manager)  
Faculty of Humanities and Social Sciences  
Daysh Building  
Newcastle University  
Newcastle upon Tyne, NE1 7RU

Telephone: 0191 208 6349  
Fax: 0191 208 7001

## Appendix 10: Fieldwork Schedule

### FIELDWORK PLANNER 2016 INC. PUBLIC & SCHOOL HOLIDAYS & FASTING MONTH (MAY-SEPT)

Tentative Fieldwork date : 8 June - 4 September 2016  
Duration : 8 months

MONTH	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Mon
MAY					1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
JUN																						
JUL																						
AUG																						
SEPT																						

SCHOOLS	DATES
S1	15 16 Jun
S2	17 18 Jun
S3	22 23 Jun
S4	24 25 Jun
S5	29 30 Jun
S6	1 2 July
S7	6 7 July
S8	8 9 July
S9	13 14 July
S10	22 23 July
S11	27 28 July
S12	29 30 July
S13	3 4 Aug
S14	5 6 Aug
S15	10 11 Aug
S16	12 13 Aug
S17	17 18 Aug
S18	19 20 Aug

DEPARTMENTS	DATES
EPU : Economic Planning Unit, PM Dept.	8 Jun
MOE : Ministry of Education	9 Jun
Dept : A2	10 19 Jun
Dept : A1	12 Jun
Dept : A3	26 Jun
Dept : A4	24 July
Dept : A5	31 July
EPU : Economic Planning Unit, PM Dept.	4 Sept

NOTES
0-24 Public Holiday
1-May Labour day
3-May Wesak Day
5-Jun King's Bday
4-Jul Nazari Qween
17-Jul Eid Fitr
31-Aug Independence
15-Sep M'9th day
23-Sep Eid Adha
School Holiday
Fasting Month
Weekend
Fieldwork
Rajya Holiday



## Appendix 11: Letter to School (Sample)

Abd. Khalik Khassunah bin Muzir,  
4, Curtis Road,  
Newcastle Upon Tyne,  
NE4 9BH, United Kingdom.  
No. Telefon : +447 776207114 (UK)  
              : 010-2719527 (Malaysia)  
Emel : a.k.k.muzir@newcastle.ac.uk

---

Pengetua,

Selangor.

3 Julai 2015

Tuan/Puan,

### **PELAKSANAAN KAJIAN DI SEKOLAH/KOLEJ**

Dengan segala hormatnya perkara di atas adalah dirujuk.

2. Sukacita dimaklumkan bahawa saya, Abd. Khalik Khassunah bin Muzir (No.K.P.: 711220-10-6511), telah menerima kelulusan daripada pihak Unit Perancang Ekonomi (UPE) dan Bahagian Perancangan dan Penyelidikan Dasar Pendidikan (BPPDP) Kementerian Pendidikan Malaysia (KPM) untuk melaksanakan kajian di institusi tuan/puan. Berikut adalah butiran pengajian dan kajian saya:

- a) Program : PhD in Education
- b) Institusi : School of Education, Communication & Language Sciences  
Newcastle University  
United Kingdom
- c) Tajuk kajian : Perancangan Penyelenggaraan Bangunan Sekolah di Malaysia: Amalan Semasa dan Implikasi Terhadap Pengguna
- d) Tarikh kajian : 19 – 20 Ogos 2015

3. Untuk makluman pihak tuan/puan, sampel kajian di atas akan melibatkan Pengetua Sekolah/Pengarah Kolej, 10 orang guru dan 30 orang murid Tingkatan 4 di institusi tuan/puan seperti butiran di Lampiran 1.

4. Sehubungan itu, disertakan dokumen-dokumen sokongan berkaitan seperti berikut untuk rujukan pihak tuan/puan:

- a) Surat kelulusan rasmi daripada UPE  
(Ruj: UPE 40/200/19/3180(8) bertarikh 6.1.2015)
- b) Surat kelulusan rasmi daripada BPPDP, KPM  
(Ruj: KP(BPPDP)603/011/Jld15(18) bertarikh 22 Disember 2014)
- c) Surat sokongan Penyalia Akademik Universiti

Kerjasama daripada pihak tuan/puan dalam perkara di atas amat dihargai dan didahului dengan ucapan ribuan terima kasih.

Sekian.

Yang benar,

**(ABD. KHALIK KHASSUNAH BIN MUZIR)**



## LAMPIRAN 1

## BUTIRAN RESPONDEN UNTUK KAJIAN

No.	Responden	Bilangan Responden	Kriteria	Kaedah Kajian
1.	Pengetua/ Pengarah Kolej	1 orang	-	<ul style="list-style-type: none"> <li>• Soal selidik</li> </ul>
2.	Guru	10 orang	<ul style="list-style-type: none"> <li>• Pelbagai guru mata pelajaran</li> <li>• Pelbagai peringkat pengalaman</li> <li>• Guru lelaki dan perempuan</li> <li>• Guru baru dan lama telah berkhidmat di sekolah/kolej ini</li> </ul>	<ul style="list-style-type: none"> <li>• Soal selidik</li> </ul>
3.	Murid	30 orang	Tingkatan 4	<ul style="list-style-type: none"> <li>• Soal selidik</li> </ul>

## Appendix 12: Support Letter from Supervisor



11 February 2015

**TO WHOM IT MAY CONCERN**

**RE: FIELDWORK IN MALAYSIA**

For your information, I am the academic supervisor of Mr Abd Khalik Khassunah Muzir (Student ID No.: 130463102), who is a registered full time PhD (Research) student with the School of Education, Communication and Language Sciences (ECLS) at Newcastle University, United Kingdom since September 2013.

As part of the requirement for his study, Mr Abd Khalik Khassunah Muzir is planning to conduct fieldwork research in Selangor and Putrajaya, Malaysia. He will be carrying out his fieldwork from 6 June 2015 to 6 September 2015 approximately. Therefore, I would be grateful if your esteemed establishment would provide him with all the necessary assistance to facilitate his research.

Your kind cooperation in this matter is highly appreciated.

Yours sincerely,



Dr. Pamela Woolner  
School of Education, Communication and Language Sciences (ECLS)  
King George VI Building  
Newcastle University  
Queen Victoria Road  
Newcastle Upon Tyne  
NE1 7RU, United Kingdom  
Tel: +44 [0]191 208 5470  
Email: [pamela.woolner@ncl.ac.uk](mailto:pamela.woolner@ncl.ac.uk)



School of Education,  
Communication &  
Language Sciences

## Appendix 13: Criteria of Respondents and Research Methodology

1.	Respondent	Criteria	Questionnaire		Interview*	
			No. of respondents	Duration	No. of respondents	Duration
i.	Principal	Currently serving in this school	1	25 min	1 (Individual)	45 min
	Teacher	<ul style="list-style-type: none"> <li>• Various genders</li> <li>• Various ethnicity</li> <li>• Various academic qualifications</li> <li>• Various subjects</li> <li>• Various teaching experience</li> <li>• Various years at current school</li> <li>• Involved/Not involved in physical school development</li> <li>• Involved/Not involved with EMIS/MySPATA</li> </ul>	10	20 min	1 (Individual)	45 min
	Pupils	<ul style="list-style-type: none"> <li>• Various genders</li> <li>• Various ethnicity</li> </ul>	30	20 min	6 (Group)	45 min
2.	Observation	Aspect	Visual Observation		File/Record	
	i. Visual observation	<ul style="list-style-type: none"> <li>• Physical condition of school building (Photo)</li> <li>• School layout plan</li> </ul>	1 hour			
	ii. File/Record	<p>Documents involving maintenance:</p> <ul style="list-style-type: none"> <li>• School strategic plan (development)</li> <li>• Development planning (maintenance)</li> <li>• School building condition record (EMIS/MySPATA)</li> <li>• Maintenance record</li> <li>• Damage report/building aspect repair</li> </ul> <p>Development project (maintenance)(last 5 years):</p> <ul style="list-style-type: none"> <li>• Government/private/alumni etc</li> </ul> <p>School development organisation</p> <ul style="list-style-type: none"> <li>• School development committee</li> <li>• Asset management committee</li> <li>• Membership/Meeting time</li> </ul>			1 hour	

\*Note: Selected schools only

## **Appendix 14: Information Sheet and Informed Consent (Sample)**

### **Appendix 14A: Information Sheet (Adult)**



#### **INFORMATION SHEET: EDUCATION OFFICER/ SCHOOL ADMINISTRATOR/ TEACHER**

**Research project on *School Buildings Maintenance Planning in Malaysia - Current Practice and Implications to End Users***

#### **Background**

This study is aimed at exploring the issue of school buildings maintenance planning in Malaysia, as part of a research thesis project to fulfil the requirement of completion for the course of PhD in Education under the School of Education, Communication and Language Science Newcastle University United Kingdom. It aims to investigate the current practices of school buildings maintenance planning in different types of government funded secondary schools. By doing this, I hope to discover the similarities and differences of school buildings maintenance planning between the different types of schools and arrive at a common approach and planning for the maintenance of school buildings in Malaysia for the future.

#### **What will the research project do and who will be involved?**

The research will cover the multitude of relevant stakeholders involved in the school buildings maintenance planning and will explore the expectations, understandings and experiences of:

- Education Officers (Ministry of Education/State Education Department)
- School Administrators
- Teachers
- Students

#### **How will we do it?**

The researcher will visit your respective organisation and conduct the following activities:

- We will gather your opinions about school buildings maintenance planning under your respective organisation by completing individual written questionnaires (20 minutes).
- We will collect your views about the school buildings maintenance planning by conducting individual interview (1 hour).
- With permission, we may audio record the interview.

### **How will the research data be treated?**

Data collected from you will be treated as confidential. Nobody but the researcher will see or hear records of what you have said. Any data used in the study will be anonymised.

### **Terms for your withdrawal**

As the participation in the research is voluntary, you can withdraw at any time without giving reasons, and that you will not be penalised for withdrawing.

### **Benefits to you as participants**

There are no direct benefits to you as participant, but it will provide you the valuable opportunity to relate your expectations, understandings and experiences in terms of current practices and implications of school building maintenance planning for future improvements.

### **Queries?**

If you want to know more about the project, or have any queries, please contact:

- Abd. Khalik Khassunah bin Muzir (Researcher)  
Email: [a.k.k.muzir@newcastle.ac.uk](mailto:a.k.k.muzir@newcastle.ac.uk)  
School of Education, Communication & Language Science,  
Newcastle University,  
Newcastle upon Tyne,  
NE1 7RU United Kingdom
- Dr. Pamela Woolner (Research Supervisor)  
Email: [Pamela.Woolner@newcastle.ac.uk](mailto:Pamela.Woolner@newcastle.ac.uk)  
School of Education, Communication & Language Science,  
Newcastle University,  
Newcastle upon Tyne,  
NE1 7RU United Kingdom
- Dr. Peter Sercombe (Research Supervisor)  
Email: [peter.sercombe@newcastle.ac.uk](mailto:peter.sercombe@newcastle.ac.uk)  
School of Education, Communication & Language Science,  
Newcastle University,  
Newcastle upon Tyne,  
NE1 7RU United Kingdom

## Appendix 14B: Information Sheet (Parent/Guardian)



### INFORMATION SHEET: PARENT/LEGAL GUARDIAN OF STUDENT

#### Research project on *School Buildings Maintenance Planning in Malaysia - Current Practice and Implications to End Users*

##### Background

This study is aimed at exploring the issue of school buildings maintenance planning in Malaysia, as part of a research thesis project to fulfil the requirement of completion for the course of PhD in Education under the School of Education, Communication and Language Science Newcastle University United Kingdom. It aims to investigate the current practices of school buildings maintenance planning in different types of government funded secondary schools. By doing this, I hope to discover the similarities and differences of school buildings maintenance planning between the different types of schools and arrive at a common approach and planning for the maintenance of school buildings in Malaysia for the future.

##### What will the research project do and who will be involved?

The research will cover the multitude of relevant stakeholders involved in the school buildings maintenance planning and will explore the expectations, understandings and experiences of:

- Education Officers (Ministry of Education/State Education Department)
- School Administrators
- Teachers
- Students

##### How will we do it?

The researcher will visit the school and conduct the following activities with your child:

- We will be collecting his/her views about the buildings by answering individual written questionnaires (20 minutes).
- We will also asking for his/her views about the school buildings by inviting some pupils to participate in group interviews (1 hour).
- With permission, we may audio record the interview.

##### How will the research data be treated?

Data collected from your child will be treated as confidential. Nobody but the researcher will see or hear records of what all he/she said. Any data used in the study will be anonymised.

### **Does my child have to take part?**

The research is on voluntary basis. If you do not agree for your child to participate in the research, please notify your child's class teacher.

### **Terms for your child's withdrawal**

As the participation in the research is voluntary, your child can withdraw at any time without giving reasons by informing the class teacher, and that he/she will not be penalised for withdrawing.

### **Benefits to your child**

There are no direct benefits to your child, but it will provide him/her the valuable opportunity to relate his/her expectations, understandings and experiences in terms of current practices and implications of school building maintenance planning for future improvements.

### **Queries?**

If you want to know more about the project, or have any queries, please contact:

- Abd. Khalik Khassunah bin Muzir (Researcher)  
Email: [a.k.k.muzir@newcastle.ac.uk](mailto:a.k.k.muzir@newcastle.ac.uk)  
School of Education, Communication & Language Science,  
Newcastle University,  
Newcastle upon Tyne,  
NE1 7RU United Kingdom
- Dr. Pamela Woolner (Research Supervisor)  
Email: [Pamela.Woolner@newcastle.ac.uk](mailto:Pamela.Woolner@newcastle.ac.uk)  
School of Education, Communication & Language Science,  
Newcastle University,  
Newcastle upon Tyne,  
NE1 7RU United Kingdom
- Dr. Peter Sercombe (Research Supervisor)  
Email: [peter.sercombe@newcastle.ac.uk](mailto:peter.sercombe@newcastle.ac.uk)  
School of Education, Communication & Language Science,  
Newcastle University,  
Newcastle upon Tyne,  
NE1 7RU United Kingdom



Appendix 14C Informed Consent (Adult)



**PARTICIPANT CONSENT FORM  
( EDUCATION OFFICERS/SCHOOL ADMINISTRATOR/TEACHER )**

**Research: *School Buildings Maintenance Planning in Malaysia - Current Practice and Implications to End Users***

I, the undersigned, confirm that (please tick box as appropriate):

1.	I have read and understood the information about the project, as provided in the Information Sheet	<input type="checkbox"/>
2.	I have been given the opportunity to ask questions about the project and my participation.	<input type="checkbox"/>
3.	I voluntarily agree to participate in the project.	<input type="checkbox"/>
4.	I understand I can withdraw at any time without giving reasons and that I will not be penalised for withdrawing nor will I be questioned on why I have withdrawn.	<input type="checkbox"/>
5.	The procedures regarding confidentiality have been clearly explained (e.g. use of names, pseudonyms, anonymisation of data, etc.) to me.	<input type="checkbox"/>
6.	The use of the data in research, publications, sharing and archiving has been explained to me.	<input type="checkbox"/>

Name : .....

Signature : .....

Date : .....



## **Appendix 15: Questionnaire (Sample)**

### **Appendix 15A: Questionnaire (Officer)**

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**SCHOOL OF EDUCATION, COMMUNICATION AND LANGUAGE SCIENCES**

#### **RESEARCH TITLE:**

**SCHOOL BUILDINGS MAINTENANCE PLANNING IN MALAYSIA:  
CURRENT PRACTICE AND IMPLICATIONS TO END USERS**

**QUESTIONNAIRE:  
OFFICER**

#### **SECTION A: GENERAL INFORMATION**

*The following information is for statistical purposes only and will be treated strictly confidential. Please tick (✓) in the space provided to indicate your responses.*

1. Gender : ☐ Male ☐ Female
2. Age : ☐ 20 – 24 years ☐ 40 – 44 years  
☐ 25 – 29 years ☐ 45 – 49 years  
☐ 30 – 34 years ☐ 50 – 54 years  
☐ 35 – 39 years ☐ 55 years and above
3. Race : ☐ Malay/Bumiputera ☐ Indian  
☐ Chinese ☐ Others: \_\_\_\_\_
4. Education Level : ☐ SPM & Below ☐ Masters  
☐ Diploma ☐ PhD  
☐ Degree ☐ Others: \_\_\_\_\_
5. Current Position : ☐ Chief Sector  
☐ Chief Assistant Director  
☐ Chief Unit  
☐ Senior Assistant Director  
☐ Assistant Director  
☐ Senior Supervisor  
☐ Other: \_\_\_\_\_
6. Years at current post : ☐ 0 – 5 years ☐ 16 – 20 years  
☐ 6 – 10 years ☐ 21 – 25 years  
☐ 11 – 15 years ☐ 26 years and above
7. Years of service : ☐ 0 – 5 years ☐ 16 – 20 years  
☐ 6 – 10 years ☐ 21 – 25 years  
☐ 11 – 15 years ☐ 26 years and above
8. Years at current agency : ☐ 0 – 5 years ☐ 10 – 20 years  
☐ 6 – 10 years ☐ 21 – 25 years  
☐ 11 – 15 years ☐ 26 years and above

#### **SECTION B: ORGANISATION INFORMATION**

1. Type of organisation : ☐ State Education Department  
☐ Department in MOE
2. Total of schools under supervision: \_\_\_\_\_

### **SECTION C: CONDITION OF SCHOOL BUILDINGS UNDER SUPERVISION**

Refer to the rating-scale shown below, and circle one number only from 1 to 6 for each category of building or building feature. Overall condition includes both physical condition and the ability of the buildings to meet the functional requirements of instructional programs.

#### **Rating scale**

<b>1</b>	<b>Extremely poor</b>	<i>Non-operational or significantly substandard performance. Replacement required.</i>
<b>2</b>	<b>Poor</b>	<i>Consistent substandard performance; failure(s) are disruptive and costly; fails most code and functional requirement; requires constant attention, renovation, or replacement. Major corrective repair or overhaul required.</i>
<b>3</b>	<b>Fair</b>	<i>Fails to meet code and functional requirement in some cases; failures(s) are inconvenient; extensive corrective maintenance and repair required.</i>
<b>4</b>	<b>Adequate</b>	<i>Some preventive maintenance and/or corrective repair required.</i>
<b>5</b>	<b>Good</b>	<i>Only routine maintenance or minor repair required.</i>
<b>6</b>	<b>Excellent</b>	<i>New or easily restorable to "like new" condition; only minimal routine maintenance required.</i>

#### **1. School buildings system/feature and conditions:**

<b>No.</b>	<b>Building System/Feature</b>	<b>Extremely Poor</b>	<b>Poor</b>	<b>Fair</b>	<b>Adequate</b>	<b>Good</b>	<b>Excellent</b>
a.	Roofs	1	2	3	4	5	6
b.	Ceilings	1	2	3	4	5	6
c.	Floors	1	2	3	4	5	6
d.	Foundation	1	2	3	4	5	6
e.	Exterior walls, finishes	1	2	3	4	5	6
f.	Interior walls, finishes	1	2	3	4	5	6
g.	Windows	1	2	3	4	5	6
h.	Doors	1	2	3	4	5	6
i.	Electrical system (Including wiring)	1	2	3	4	5	6
j.	Lightings	1	2	3	4	5	6
k.	Ventilation/Fans	1	2	3	4	5	6
l.	Plumbing	1	2	3	4	5	6

No.	Building System/Feature	Extremely Poor	Poor	Fair	Adequate	Good	Excellent
m.	Water supply system	1	2	3	4	5	6
n.	Toilets	1	2	3	4	5	6
o.	Drainage system	1	2	3	4	5	6
p.	Sewerage system	1	2	3	4	5	6
q.	The overall condition of the school in general	1	2	3	4	5	6

Source: Wisconsin Department of Public Instruction (1999), School Facility Survey  
US Department of Education (2012), Fast Response Survey System

#### **SECTION D: SATISFACTION LEVEL WITH SCHOOL BUILDINGS CONDITION**

- The following statements are about your satisfaction level with regards to the condition of the school buildings under your agency supervision. *Please read each statement carefully and circle the appropriate number from 1 to 4 according to your response using the following rating scale:*

No.	Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
a.	The buildings are a comfortable place to be	1	2	3	4
b.	This buildings are pleasing in appearance	1	2	3	4
c.	This buildings are neat and clean	1	2	3	4
d.	There are enough spaces for teaching and learning	1	2	3	4
e.	The facilities are adequate to support learning	1	2	3	4
f.	The facilities are regularly maintained	1	2	3	4

Source: Ullme and Tschannen-Moran (2008)

2. In general, how satisfactory or unsatisfactory are the following factors in the classrooms in the school buildings under your agency supervision? *Circle the appropriate number from 1 to 4 according to your response using the following rating scale.*

No.	Factor	Very Unsatisfactory	Unsatisfactory	Satisfactory	Very Satisfactory
a.	Artificial lighting	1	2	3	4
b.	Natural lighting	1	2	3	4
c.	Ventilation	1	2	3	4
d.	Provision of fans	1	2	3	4
e.	Indoor air quality	1	2	3	4
f.	Acoustics or noise control	1	2	3	4
g.	Physical condition of ceilings, floors, walls, windows, doors	1	2	3	4

Source: U.S. Department of Education (2005)

#### SECTION E: IMPLICATION ON TEACHING AND LEARNING

1. To what extent do the following factors influence with the ability of the school buildings under your agency supervision to deliver education in classrooms? *For each factor, tick only one choice in the nature of influence column. Next, circle one choice only in the degree of influence.*

No.	Factor	Nature of Influence* (Tick ✓ one column only)			Degree of Influence (Do not circle below if nature of influence* is neutral)		
		Negative	Neutral	Positive	Minor	Moderate	Major
a.	Artificial lighting				1	2	3
b.	Natural lighting				1	2	3
c.	Ventilation				1	2	3
d.	Provision of fans				1	2	3
e.	Indoor air quality				1	2	3
f.	Acoustics or noise control				1	2	3
g.	Physical condition of ceilings, floors, walls, windows, doors				1	2	3

Source: U.S. Department of Education (2005)

2. Rate the extent to which the physical condition of the school under your agency supervision impacted each of the following conditions during the school periods. *Circle one choice only for each statement.*

No.	Statement	Had no impact	Had very little impact	Had some impact	Had a strong impact
a.	Affected the school's ability to offer extended learning time (i.e. before school, after school)	1	2	3	4
b.	Affected the school's ability to retain highly effective teachers	1	2	3	4
c.	Affected the school's ability to maintain an adequately safe and orderly environment	1	2	3	4
d.	Affected the school's ability to create and support a positive school climate	1	2	3	4
e.	Affected the school's ability to create active parent participation opportunities	1	2	3	4
f.	Affected the school's ability to promote instructional strategies that incorporate active student learning (i.e. small group)	1	2	3	4

Source: Harrison (2010)

3. In your opinion, to what extent do the school buildings under your agency's supervision meet the needs of the educational program?

- ☐ All facilities meet the needs  
☐ Most facilities meet the needs  
☐ Some facilities meet the needs  
☐ Few facilities meet the needs  
☐ None of the facilities meet the needs

Source: Moulton (1998).

## **SECTION F: MAINTENANCE OF SCHOOL BUILDINGS UNDER YOUR SUPERVISION**

*Please tick ( ✓ ) in the space provided to indicate your responses.*

1. To what extend are you proud of the overall condition of the school facilities under your agency's supervision?  
  
☐ To a great extend  
☐ To a significant extend  
☐ To a small extend  
☐ Not at all
2. Does your organisation have any written policy document on school buildings maintenance as main reference in maintaining school buildings under its supervision?  
  
☐ Yes. Please specify: \_\_\_\_\_  
☐ No  
☐ Not sure
3. Does your organisation have a written school buildings maintenance plan document for schools under its supervision?  
  
☐ Yes. Please specify: \_\_\_\_\_  
☐ No  
☐ Not sure
4. Is school building maintenance planning a component of overall organisational planning?  
  
☐ Yes  
☐ No  
☐ Not sure
5. From the list below, which groups are involved in the school building maintenance planning for schools under the agency's supervision? *(Select all that are applicable)*  
  
☐ MOEM Division  
☐ State Education Department  
☐ District Education Office  
☐ School  
☐ Others. Please specify: \_\_\_\_\_
6. The school maintenance planning for schools under your supervision usually includes: *(Select all that are applicable)*  
  
☐ Short term planning  
☐ Long term planning  
☐ No planning

7. How often are the school maintenance planning for schools under your supervision updated?
- ☐ 6 months
  - ☐ 1 year
  - ☐ 2 years
  - ☐ 3 years
  - ☐ Not updated
8. Facility condition assessment and survey inspection for schools under your supervision is typically done by: *(Select all that are applicable)*
- ☐ Visual inspection
  - ☐ Use of hand tools, meters, sensors, etc.
  - ☐ Use of building assessment and inspection software
  - ☐ Recording video and images of building condition and components
  - ☐ Not done
9. Facility condition assessment for schools under your supervision is typically done:
- ☐ Once in six months
  - ☐ Once in a year
  - ☐ Once in two years
  - ☐ Once in three to five years
  - ☐ Not done
10. Facility condition assessment for schools under your supervision is:
- ☐ Recorded using standard checklists and forms
  - ☐ Recorded by writing assessment on blank papers or record books
  - ☐ Not done
11. How is the condition assessment data for schools under your supervision stored?
- ☐ In computer (e.g. MS excel, word, note pad, etc.)
  - ☐ In paper file
  - ☐ Use of assessment software
  - ☐ Not applicable
12. The facility condition findings are used for: *(Select all that are applicable)*
- ☐ Short term facility planning
  - ☐ Long term facility planning
  - ☐ Routine operations and maintenance
  - ☐ Establishing benchmarks for measuring equipment/component's life
  - ☐ Preventive maintenance
  - ☐ Not applicable

Source: Lay & Bilbo (2009).



13. In your opinion, what is the ONE main rationale for the school building maintenance carried out in schools under your agency's supervision?
- ☐ Health and safety of the school community
  - ☐ Effectiveness of teaching and learning process
  - ☐ Economic importance (e.g.: extending asset's life expectancy)
  - ☐ Important as government's delivery of social service
  - ☐ Compliance of law
  - ☐ Maintain the government's image
  - ☐ Others. Please specify: \_\_\_\_\_
14. In your opinion, your agency considers maintaining school facilities as:
- ☐ Top priority
  - ☐ One of top priorities
  - ☐ A middle priority
  - ☐ A low priority
  - ☐ Not a priority
15. In maintaining school facilities under its supervision, the agency is primarily:
- ☐ Proactive (i.e. taking pre-emptive action against potential problems or situation)
  - ☐ Reactive (i.e. acting in response to a problem or situation)
  - ☐ No action at all
16. In schools under your agency's supervision, who is usually the primary impetus for the school actions regarding school buildings maintenance?
- ☐ School
  - ☐ PTA
  - ☐ Public
  - ☐ Community leader
  - ☐ Mass media
  - ☐ Others. Please specify: \_\_\_\_\_
17. School buildings maintenance in schools under your agency's supervision is carried out by:  
(Select all that are applicable)
- ☐ External contractor
  - ☐ School staff
  - ☐ School technician
  - ☐ Teachers
  - ☐ Others. Please specify: \_\_\_\_\_
18. School buildings maintenance is more efficient and cost-effective when it is performed by:
- ☐ External contractor
  - ☐ School staff
  - ☐ School technician
  - ☐ Teachers
  - ☐ Others. Please specify: \_\_\_\_\_

19. In your opinion, the amount of money spent on the maintenance of school buildings under your agency's supervision is:
- ☐ More than adequate
  - ☐ Adequate
  - ☐ Less than adequate
20. How does the allocation for school buildings maintenance usually given by your agency to the schools under its supervision? *(Select all that are applicable)*
- ☐ Annual operating expenditure
  - ☐ Based on school application
  - ☐ Based on the agency's maintenance planning
  - ☐ Others. Please specify: \_\_\_\_\_
21. In your opinion, how should fund for school buildings maintenance given by government? *(Select all that are applicable)*
- ☐ Annual dedicated maintenance allocation (e.g. per capita grant assistance)
  - ☐ Special 'one-off' allocation every 5 years
  - ☐ Based on school application
  - ☐ Others. Please specify: \_\_\_\_\_
22. Do schools under your supervision receive any allocation for the purpose of school buildings maintenance in the last 5 years? *(Select all that are applicable)*
- ☐ Operating expenditure (B.41) MOEM (e.g. OS 28000/OS 32000)
  - ☐ Special Stimulus Package Programme MOEM (The School Construction, Upgrading and Maintenance Fund)
  - ☐ Development expenditure (P.41) 10<sup>th</sup> Malaysia Plan MOEM
  - ☐ Others. Please specify: \_\_\_\_\_
  - ☐ None
23. Do schools under your supervision receive any additional financial resource for school buildings maintenance from the following sources? *(Select all that are applicable)*
- ☐ Corporate donation
  - ☐ Fund raising program
  - ☐ PTA
  - ☐ School alumni
  - ☐ Others. Please specify: \_\_\_\_\_
  - ☐ None

Source: Moulton (1998).

24. As an officer, do you receive enough information regarding the need to maintain your school buildings to make effective decision?
- ☐ More than enough
  - ☐ Enough
  - ☐ Less than enough
  - ☐ No information

25. As an officer, do you receive enough training to effectively manage the maintenance of your school buildings?

- ( ) More than enough  
 ( ) Enough  
 ( ) Less than enough  
 ( ) No training

26. From the following list, please rank the building system/feature from 1 to 16 according to:

- i) the most pressing maintenance issues in schools under your agency's supervision (where 1 is the most pressing concern).  
 ii) the most important maintenance aspect in school in general (where 1 is most important).

Place a "1" next to the building system/feature that is most pressing/important, a "2" for the next most pressing/important, and so on.

No.	Building System/Feature	Most pressing maintenance issue in schools under your agency supervision	Most important maintenance aspect in school in general
a.	Roofs		
b.	Ceilings		
c.	Floors		
d.	Foundation		
e.	Exterior walls, finishes		
f.	Interior walls, finishes		
g.	Windows		
h.	Doors		
i.	Electrical system (including wiring)		
j.	Lightings		
k.	Ventilation/Fans		
l.	Plumbing		
m.	Water supply system		
n.	Toilets		
o.	Drainage system		

No.	Building System/Feature	Most pressing maintenance issue in schools under your agency supervision	Most important maintenance aspect in school in general
p.	Sewerage system		
q.	Pest Control		

Source: Lavy & Bilbo (2009).

27. Your other comments on the issues/challenges of school buildings maintenance in schools under Your agency's supervision:

Thank you for your cooperation.

Appendix 15B: Questionnaire (Student)

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SCHOOL OF EDUCATION, COMMUNICATION AND LANGUAGE SCIENCE

RESEARCH TITLE:

**SCHOOL BUILDINGS MAINTENANCE PLANNING IN MALAYSIA:  
CURRENT PRACTICE AND IMPLICATIONS TO END USERS**

**QUESTIONNAIRE:  
STUDENT**

## **SECTION A: GENERAL INFORMATION**

*The following information is for statistical purposes only and will be treated strictly confidential. Please tick (✓) in the space provided to indicate your responses.*

1. Gender : ☐ Male ☐ Female
2. Race : ☐ Malay/Bumiputera ☐ Indian  
☐ Chinese ☐ Others: \_\_\_\_\_
3. Type of secondary school : ☐ National Secondary  
☐ Fully residential  
☐ Technical/Vocational  
☐ Religious Secondary Schools
4. Form : \_\_\_\_\_
5. Years at current school : ☐ 0 – 1 years  
☐ 2 – 3 years  
☐ 4 – 5 years

## **SECTION B: CONDITION OF MY SCHOOL BUILDINGS**

*Refer to the rating-scale shown below, and circle one number for each category of building or building feature. Overall condition includes both physical condition and the ability of the buildings to meet the functional requirements of instructional programs.*

### ***Rating scale***

1	<b>Extremely poor</b>	<i>Non-operational or significantly substandard performance. Replacement required.</i>
2	<b>Poor</b>	<i>Consistent substandard performance; failure(s) are disruptive and costly; fails most code and functional requirement; requires constant attention, renovation, or replacement. Major corrective repair or overhaul required.</i>
3	<b>Fair</b>	<i>Fails to meet code and functional requirement in some cases; failures(s) are inconvenient; extensive corrective maintenance and repair required.</i>
4	<b>Adequate</b>	<i>Some preventive maintenance and/or corrective repair required.</i>
5	<b>Good</b>	<i>Only routine maintenance or minor repair required.</i>
6	<b>Excellent</b>	<i>New or easily restorable to "like new" condition; only minimal routine maintenance required.</i>

1. My school buildings system/feature and conditions:

No.	Building System/Feature	Extremely Poor	Poor	Fair	Adequate	Good	Excellent
a.	Roofs	1	2	3	4	5	6
b.	Ceilings	1	2	3	4	5	6
c.	Floors	1	2	3	4	5	6
d.	Foundation	1	2	3	4	5	6
e.	Exterior walls, finishes	1	2	3	4	5	6
f.	Interior walls, finishes	1	2	3	4	5	6
g.	Windows	1	2	3	4	5	6
h.	Doors	1	2	3	4	5	6
i.	Electric system (Including Wiring)	1	2	3	4	5	6
j.	Lightings	1	2	3	4	5	6
k.	Ventilation/Fans	1	2	3	4	5	6
l.	Plumbing	1	2	3	4	5	6
m.	Toilets	1	2	3	4	5	6
n.	Water supply system	1	2	3	4	5	6
o.	Drainage system	1	2	3	4	5	6
p.	Sewerage system	1	2	3	4	5	6
q.	The overall condition of the school in general	1	2	3	4	5	6

Source: Wisconsin Department of Public Instruction (1999), School Facility Survey  
US Department of Education (2012), Fast Response Survey System

### SECTION C: SATISFACTION LEVEL

1. The following statements are about your satisfaction level with regards to the condition of your school building. *Please read each statement carefully and circle the appropriate number from 1 to 4 according to your response using the following rating scale:*

No.	Statement	Strongly Disagree	Disagree	Agree	Strongly Agree
a.	The building is a comfortable place to be	1	2	3	4
b.	This building is pleasing in appearance	1	2	3	4
c.	This building is neat and clean	1	2	3	4
d.	There is enough space for teaching and learning here	1	2	3	4
e.	The facilities here are adequate to support learning	1	2	3	4
f.	The facilities here are regularly maintained	1	2	3	4

Source: Ullme and Tschannen-Moran (2008)

2. In general, how satisfactory or unsatisfactory are the following factors in the classrooms in your school? *Circle the appropriate number from 1 to 4 according to your response using the following rating scale.*

No.	Factor	Very Unsatisfactory	Unsatisfactory	Satisfactory	Very Satisfactory
a.	Artificial lighting	1	2	3	4
b.	Natural lighting	1	2	3	4
c.	Ventilation	1	2	3	4
d.	Provision of fans	1	2	3	4
e.	Indoor air quality	1	2	3	4
f.	Acoustics or noise control	1	2	3	4
g.	Physical condition of ceilings, floors, walls, windows, doors	1	2	3	4

Source: U.S. Department of Education (2005)



#### SECTION D: IMPACT AND IMPLICATION

1. To what extent do the following factors influence with the ability of your school to deliver education in classrooms located in permanent buildings? *For each factor, tick only one choice in the nature of influence column. Next, circle one choice only in the degree of influence column.*

No.	Factor	Nature of Influence* (Tick ✓ one column only)			Degree of Influence (Do not circle below if nature of influence* is neutral)		
		Negative	Neutral	Positive	Minor	Moderate	Major
a.	Artificial lighting				1	2	3
b.	Natural lighting				1	2	3
c.	Ventilation				1	2	3
d.	Provision of fans				1	2	3
e.	Indoor air quality				1	2	3
f.	Acoustics or noise control				1	2	3
g.	Physical condition of ceilings, floors, walls, windows, doors				1	2	3

Source: U.S Department of Education (2005)

2. Rate the extent to which the physical condition of your school impacted each of the following conditions during the last school year: The physical condition of the building: *Circle one choice only for each statement.*

No.	Statement	Had no impact	Had very little impact	Had some impact	Had a strong impact
a.	Affected the school's ability to offer extended learning time (i.e. before school, after school)	1	2	3	4
b.	Affected the school's ability to maintain an adequately safe and orderly environment	1	2	3	4
c.	Affected the school's ability to create and support a positive school climate	1	2	3	4
d.	Affected the school's ability to create active parent participation opportunities	1	2	3	4
e.	Affected the school's ability to enable active student learning (i.e. small group)	1	2	3	4

Source: Harrison (2010)

3. In your opinion, to what extent is your school building meet the needs of the educational program?

- ( ) All facilities meet the needs
- ( ) Most facilities meet the needs
- ( ) Some facilities meet the needs
- ( ) Few facilities meet the needs
- ( ) None of the facilities meet the needs

Source: Moulton (1998).

#### **SECTION E: MAINTENANCE OF MY SCHOOL BUILDING**

*The following information is for statistical purposes only and will be treated strictly confidential. Please tick (✓) in the space provided to indicate your responses.*

1. To what extent is your community (parents/neighbours) proud of the overall condition of its school facilities?

- ( ) To a great extent
- ( ) To a significant extent
- ( ) To a small extent
- ( ) Not at all

2. In your opinion, maintaining school facilities is:

- ( ) Your school's top priority
- ( ) One of your school's top priorities
- ( ) A middle priority
- ( ) A low priority
- ( ) Not a priority

3. In maintaining your school facilities, is your school primarily:

- ( ) Proactive (i.e. taking pre-emptory action against potential problems or situation)
- ( ) Reactive (i.e. acting in response to a problem or situation)
- ( ) No action at all

4. In your opinion, the amount of money spent on the maintenance of your school facilities is:

- ( ) Better than adequate
- ( ) Adequate
- ( ) Less than adequate

5. How has your school raised funds to improve school facilities over the years? *(Please check all that apply)*

- ( ) Donation
- ( ) Fund raising program
- ( ) PTA
- ( ) School Alumni
- ( ) Others. Please state : \_\_\_\_\_
- ( ) None

Source: Moulton (1998).

6. From the following list, please rank the building system/feature from 1 to 16 according to:

- i) the most pressing maintenance issues in your school (where 1 is the most pressing concern).
- ii) the most important maintenance aspect in general in any school. (where 1 is most important)

Place a "1" next to the building system/feature that is most pressing/important, a "2" for the next most pressing/important, and so on.

No.	Building System/Feature	Most pressing concern in your school	Most important maintenance in school
a.	Roofs		
b.	Ceilings		
c.	Floors		
d.	Foundation		
e.	Exterior walls, finishes		
f.	Interior walls, finishes		
g.	Windows		
h.	Doors		
i.	Electric system (including wiring)		
j.	Lightings		
k.	Ventilation/Fans		
l.	Plumbing		
m.	Toilets		
n.	Water supply system		
o.	Drainage system		
p.	Sewerage system		
q.	Pest Control		

Source: Lavy & Bilbo (2009).

7. Your other comments on the issue/challenges of maintenance in school:

Thank you for your cooperation.

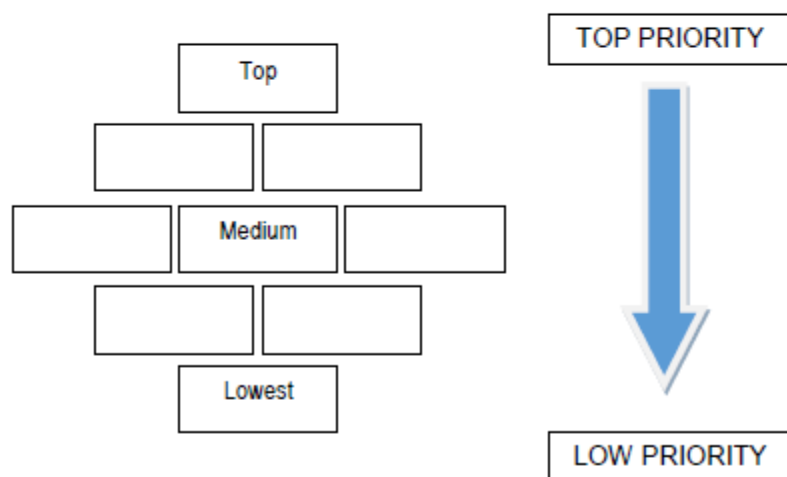


School Buildings Maintenance Planning In Malaysia:  
Current Practice and Implications to End Users

**DIAMOND RANKING: PRIORITIES IN MAINTENANCE ISSUES**

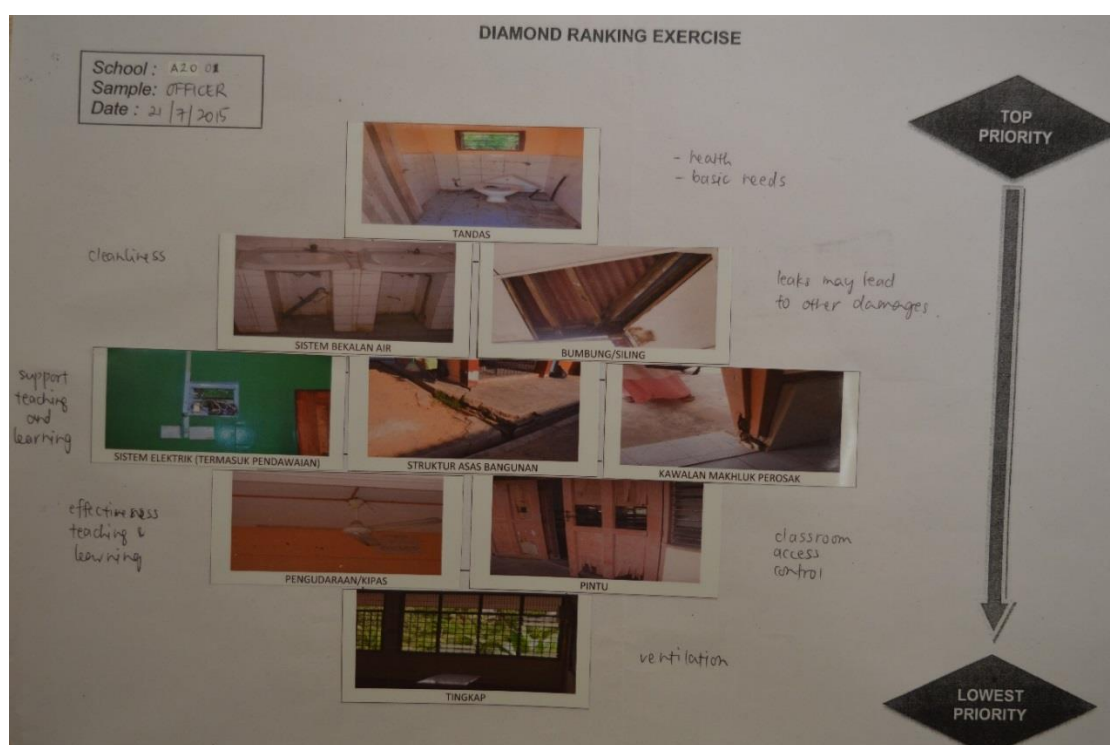
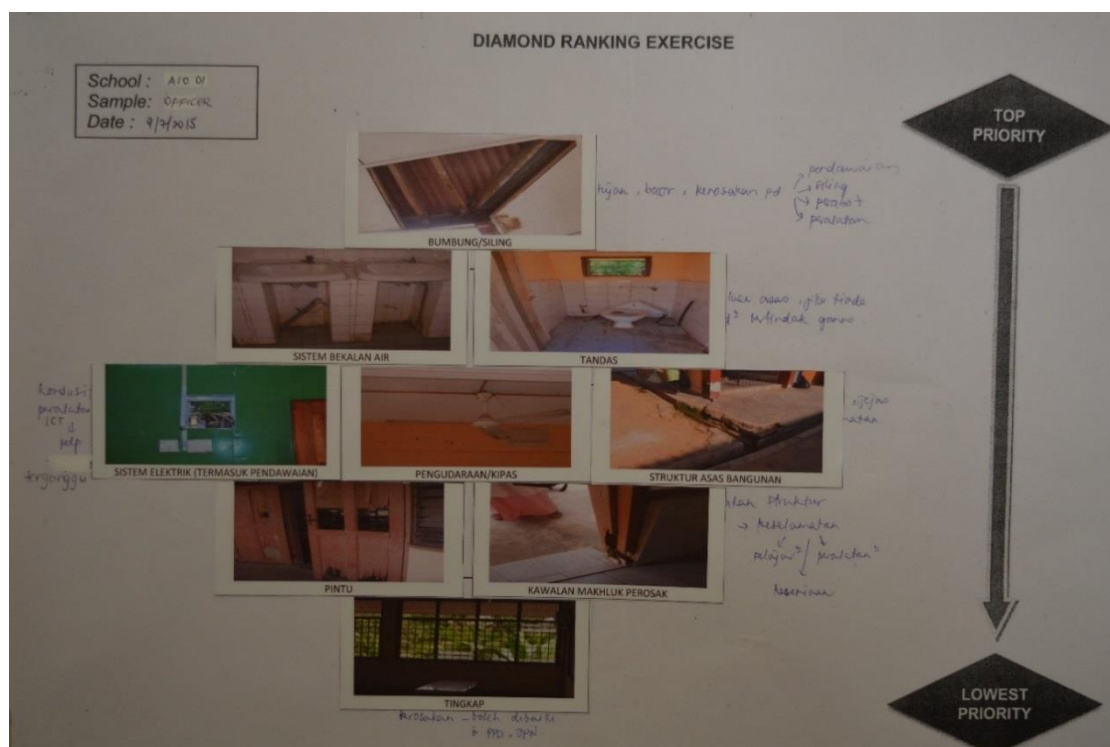
**Instruction:**

1. Look carefully at the nine (9) photographs provided of the examples of maintenance issue and think about them in your current school context.
2. Discuss and work in groups to place them in the following diamond shape as shown below:
3. Write short statements on the reasons for the order in which the photos are arranged.

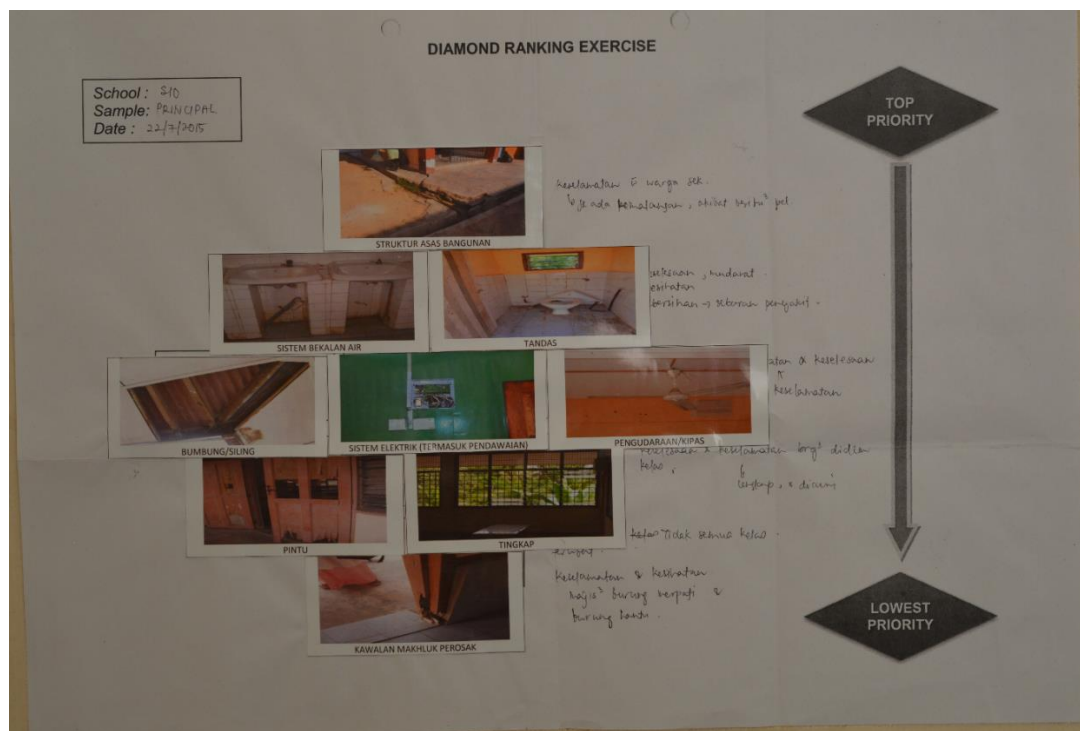
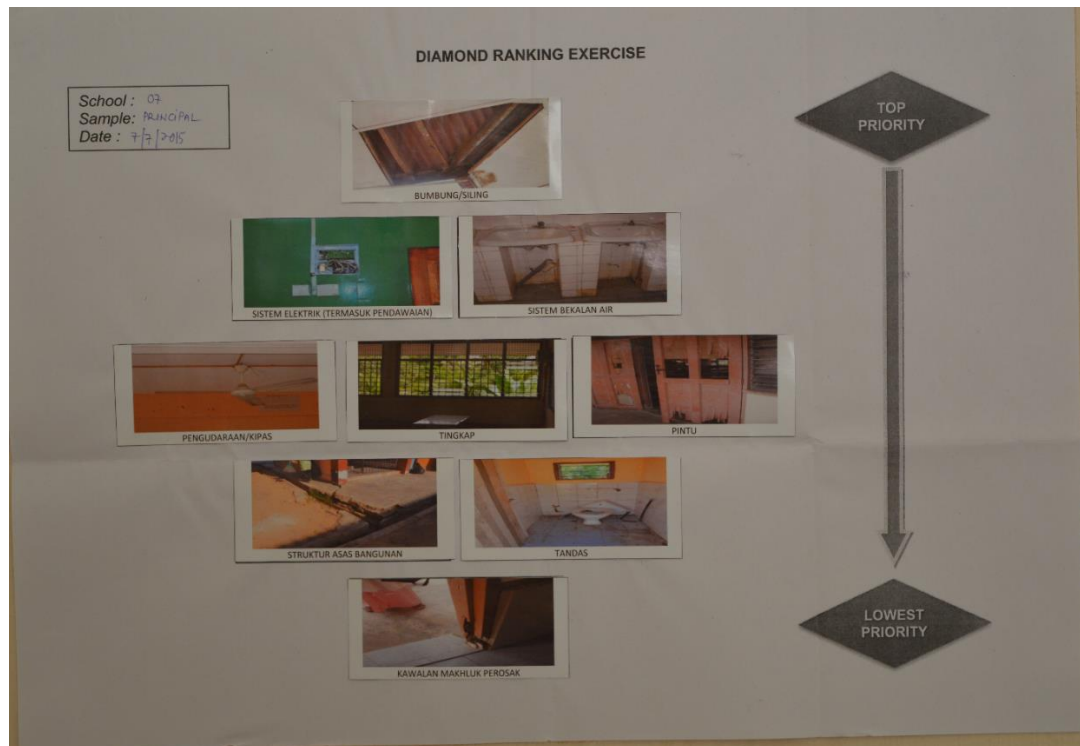


## Appendix 17: Diamond Ranking Exercise Photo (Sample)

### Appendix 17A: Officer

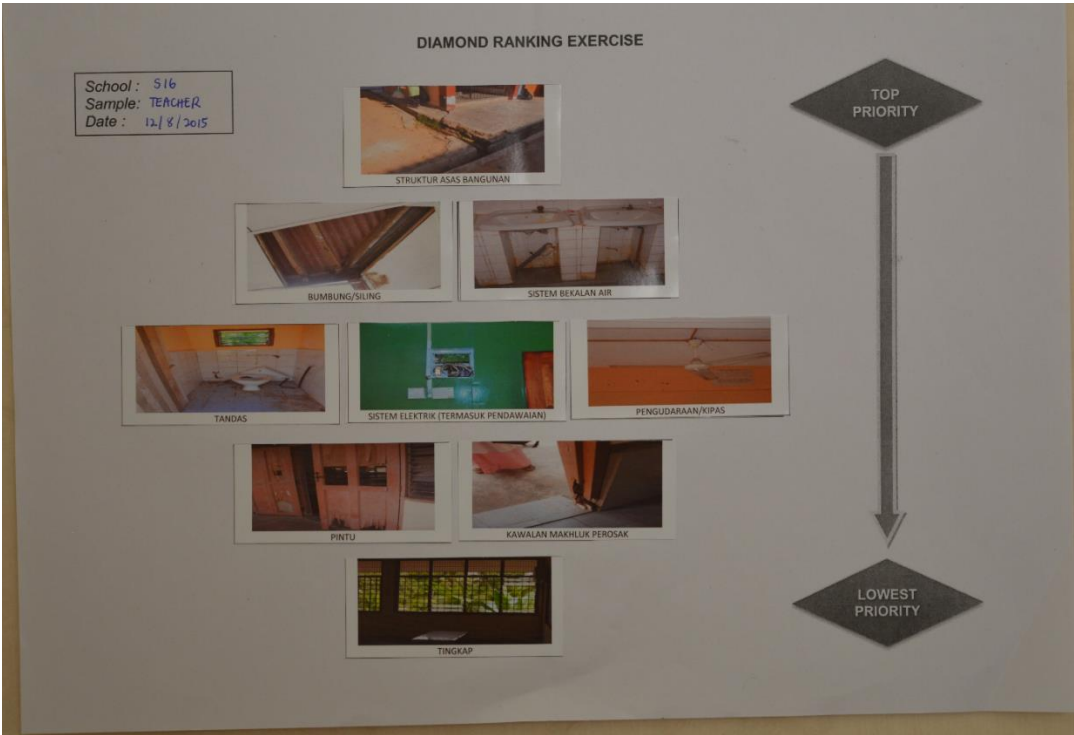
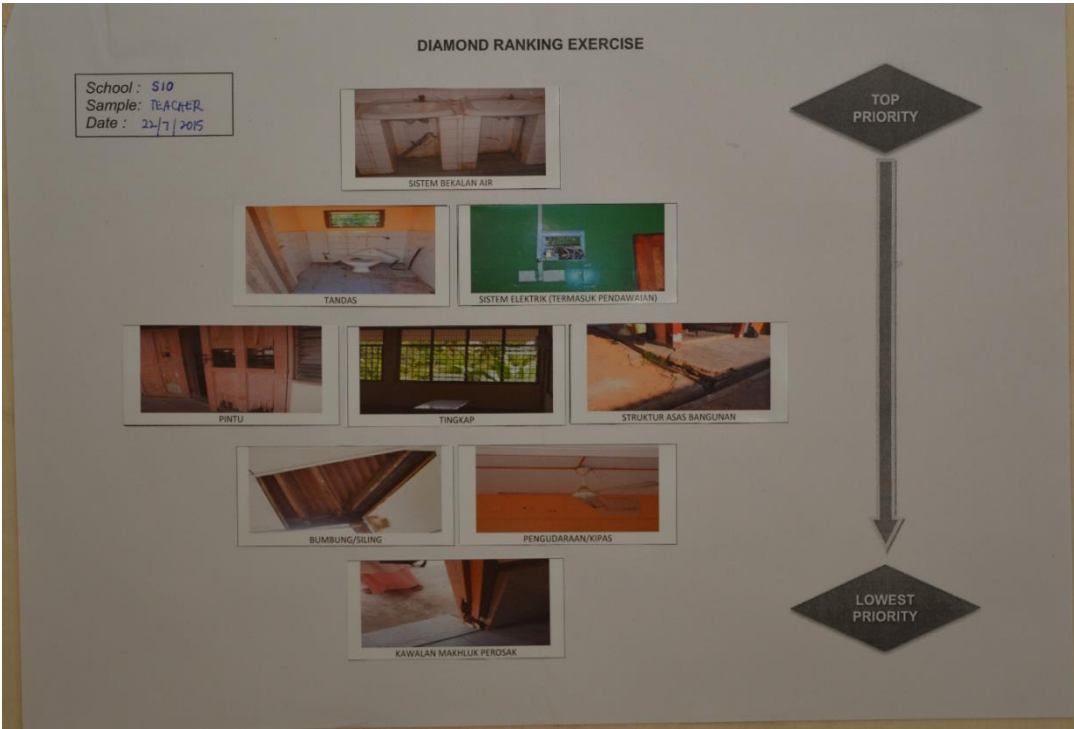


## Appendix 17B: Principal



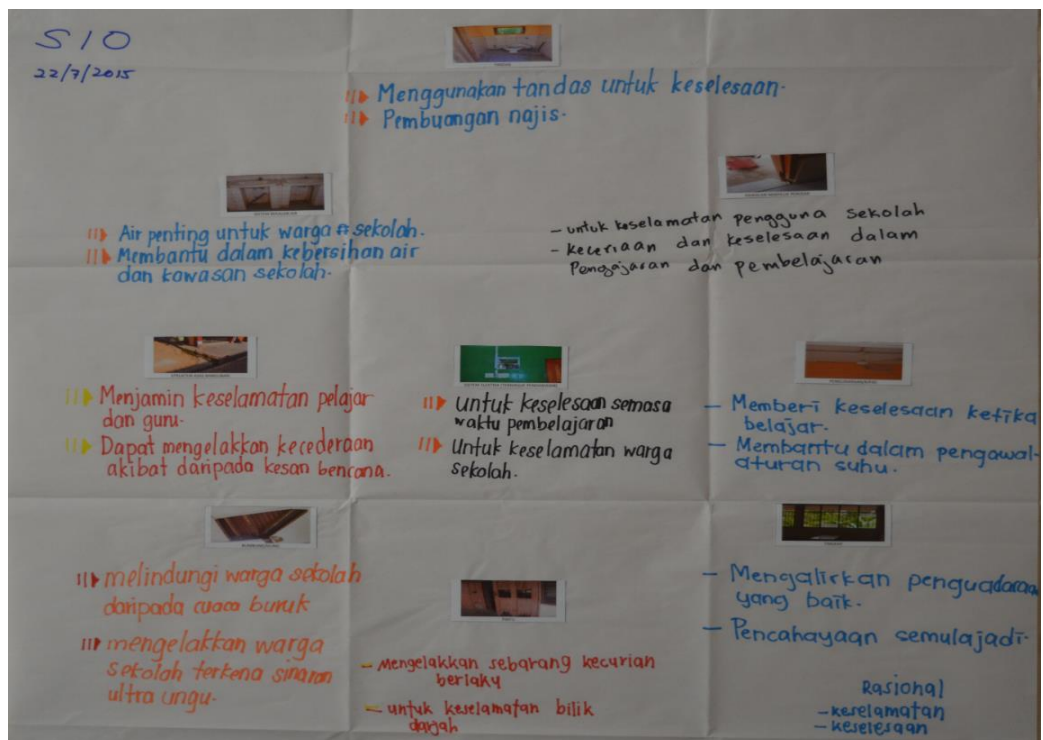
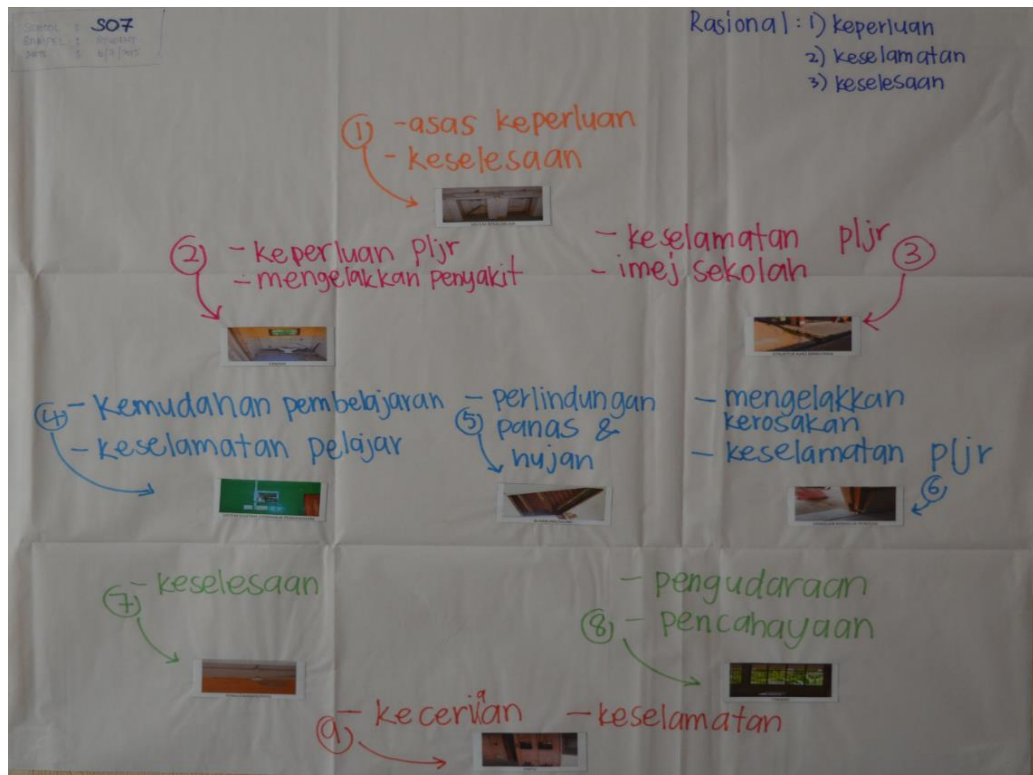


Appendix 17C: Teacher





## Appendix 17D: Student



## Appendix 18: Semi-Structured Interview Schedule

Date of Interview :

Gender :

School/School code :

Type of respondent :

Length of service :

Length in current post :

Length of service at current school :

Age :

Post :

### SECTION A: DIAMOND RANKING

No.	Aspect	Rationales
1.	Pest control	
2.	Roof/Ceiling	
3.	Foundation	
4.	Electrical system	
5.	Toilet	
6.	Water supply	
7.	Window	
8.	Door	
9.	Ventilation/Fan	

### SECTION B: INTERVIEW

ASPECT	QUESTION
1. Awareness	What is your opinion on physical condition of building and school?
	Apakah pandangan anda tentang keadaan bangunan sekolah anda?
	In your opinion, is physical condition of your school important?
	Adakah anda berpendapat keadaan bangunan sekolah itu faktor penting?
2. Current condition	How would you describe the physical condition of your school?
	Gambarkan keadaan bangunan sekolah anda.
3. User satisfaction (Building perform.)	How would you describe the end user's satisfaction level with the current physical condition of your school?
	Gambarkan tahap kepuasan anda sebagai pengguna terhadap keadaan bangunan sekolah anda sekarang?
4. Policy Awareness	How would you describe the policy on school buildings and maintenance by the government, Ministry, SED or DEO?

	<p>Bagaimanakah anda gambarkan polisi Kerajaan terhadap bangunan sekolah dan penyelenggaraannya?</p> <p>Any specific guidelines provided like circular or policy documents?</p> <p>Adakah terdapat sebarang pekeliling atau dokumen rasmi yang menjelaskan perkara tersebut?</p>
5. Philosophy	<p>What is your opinion on school building maintenance?</p> <p>Apakah pendapat anda tentang penyelenggaraan bangunan sekolah?</p> <p>Do you think we should maintain school building?</p> <p>Adakah anda berpendapat kita perlu menyelenggara bangunan sekolah?</p> <p>How would you describe the building maintenance of your school?</p> <p>Cuba terangkan penyelenggaraan bangunan di sekolah anda.</p> <p>How would you rank maintenance in your school management philosophy/agenda?</p> <p>Bagaimanakah anda meletakkan keutamaan penyelenggaraan di sekolah anda?</p>
6. Level of Knowledge	<p>How would you describe your knowledge and experience in building maintenance?</p> <p>Gambarkan tahap ilmu dan pengalaman anda dalam penyelenggaraan bangunan?</p>
7. Training	<p>In your opinion, what type of formal training is currently available to handle maintenance issue in school?</p> <p>Pada pendapat anda, apakah jenis latihan yang ditawarkan sekarang untuk menguruskan isu penyelenggaraan bangunan sekolah?</p>
8. Planning	<p>How do you cater for the maintenance needs of your school?</p> <p>Bagaimanakah anda memenuhi keperluan penyelenggaraan bangunan sekolah anda?</p> <p>How would you describe the building maintenance planning of your school? Are there any strategic planning, document, short/long term?</p> <p>Bagaimanakah anda gambarkan perancangan penyelenggaraan bangunan sekolah anda?</p>
9. Process, Forms & Mechanism?	<p>How does maintenance issue dealt within your school? (Internal)</p> <p>Jelaskan bagaimana isu penyelenggaraan (dalaman) diuruskan di agensi anda?</p> <p>Could you describe the process of handling maintenance issue with the authorities? (External)</p> <p>Jelaskan bagaimana isu penyelenggaraan sekolah anda diuruskan dengan pihak luar?</p> <p>What are the main challenges here?</p> <p>Apakah cabaran utama penyelenggaraan?</p>
10. Data	<p>What about maintenance data management?</p> <p>Pengurusan data penyelenggaraan</p>

	<p>What is your opinion on data system on maintenance EMIS and MySpata?</p> <p>Apakah pendapat anda tentang sistem data EMIS dan MySpata</p> <p>.</p> <p>What is your opinion on EMIS and MySpata all about?</p>
11. Priority	<p>How to determine priorities in maintenance? Basis of priority?</p> <p>Bagaimanakah anda menentukan keutamaan dalam menangani isu penyelenggaraan?</p>
12. Funds	<p>Could you describe alternative source of funds for maintenance?</p> <p>Sumber kewangan utama selain kerajaan (jika ada)</p>
13. Support	<p>How do you describe the support of the school community, external community, Ministry, SED and DEO?</p> <p>Cuba jelaskan sokongan yang diberikan oleh: komuniti sekolah, komuniti sekitar, KPM?JPN?PPD?</p>
14. Role	<p>In terms of school maintenance, how would you describe the role of: yourself, school community, external community, Ministry, SED and DEO?</p> <p>Bagaimanakah anda jelaskan peranan mereka ini dalam penyelenggaraan bangunan sekolah? Anda? Komuniti sekolah, komuniti sekitar, KPM?JPN?PPD?</p>
15. Implementation	<p>How does the maintenance in your school carried out? Is it internal or external? Which one is better?</p> <p>Bagaimanakah penyelenggaraan di sekolah anda ditangani? Dalam? Luaran? Mana lebih baik dan kenapa?</p>
	<p>What was the last maintenance done in the school in the past 5 years?</p> <p>Apakah kerja penyelenggaraan yang telah dilaksanakan di sekolah anda dalam 5 tahun terakhir?</p> <p>How would you rate the maintenance level of your school building in terms of fulfilling the standard and function of the school?</p> <p>Bagaimanakah anda ukur tahap penyelenggaraan bangunan sekolah anda dalam memenuhi standard dan fungsi sekolah anda?</p>
16. Evaluation	<p>How would you describe it in terms of what is planned based on requirement and actual implementation?</p> <p>Bagaimanakah anda jelaskan penyelenggaraan yang dirancang pihak sekolah dan apa yang telah dilaksanakan sehingga kini?</p>
17. Common building maintenance problem	<p>In your opinion, what are the most common aspects of school building maintenance faced in your school?</p> <p>Apakah masalah utama daripada aspek penyelenggaraan yang dihadapi di sekolah anda?</p>
18. Implication to end user	<p>Have you experienced any problems with regards to school building conditions due to maintenance that affected the school in anyway?</p> <p>Adakah anda pernah mengalami sebarang masalah bangunan sekolah berpunca daripada isu penyelenggaraan yang memberi</p>

	kesan/impak kepada sekolah?
19. Challenges	<p>In the context of PIPP, what is the changes you foresee or hope to see in terms of school building maintenance?</p> <p>Dalam konteks PIPP, apakah perubahan yang dijangka atau anda hasratkan dalam aspek penyelenggaraan bangunan sekolah?</p> <p>What would you see as the main challenges in school building maintenance in your school currently and in future?</p> <p>Apakah yang anda lihat sebagai cabaran utama dalam penyelenggaraan bangunan sekolah di sekolah anda? Cabaran kini dan masa depan?</p>
20. Aspiration/Way forward	<p>Ideally, what would you have done if you have the power to make a difference in terms of maintenance?</p> <p>Jika anda diberi peluang untuk mengubah keadaan, apakah yang anda akan lakukan dalam aspek penyelenggaraan bangunan sekolah?</p> <p>Are there any ways you feel maintenance of school building could be improved?</p> <p>Adakah sebarang penambahbaikan yang anda rasa diperlukan daripada sebarang aspek berikut?</p>
21. CSF	<p>Critical success factors of maintenance?</p> <p>Apakah faktor kritikal kejayaan dalam penyelenggaraan bangunan sekolah?</p>
22. Comments	<p>Do you have any other comments about what we have discussed or maybe anything about the topic?</p> <p>Sebelum kita berakhir, adakah apa-apa komen tambahan yang ingin diutarakan tentang apa yang telah kita bincangkan tadi?</p>

**Appendix 19: Walk-through Observation Checklist**

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**TAJUK KAJIAN:**

**PERANCANGAN PENYELENGGARAAN BANGUNAN SEKOLAH DI MALAYSIA:  
AMALAN SEMASA DAN IMPLIKASI TERHADAP PENGGUNA**

**WALK THROUGH  
OBSERVATION**

DATE :

TIME :

#### **BAHAGIAN A: PROFIL SEKOLAH**

Rujuk maklumat EMIS sebagai bahan rujukan.

#### **BAHAGIAN B: KEADAAN BANGUNAN SEKOLAH**

*Dengan merujuk pada skala berikut, bulatkan hanya satu pilihan sahaja dari skala 1 hingga 6 bagi setiap sistem atau ciri-ciri bangunan. Keadaan keseluruhan termasuklah dari aspek keadaan fizikal dan keupayaan bangunan untuk memenuhi fungsi yang ditetapkan dalam program instruksional.*

*Skala*

1	<b><i>Amat Lemah</i></b>	<i>Gagal berfungsi atau prestasi tidak mencapai standard. Penggantian diperlukan.</i>
2	<b><i>Lemah</i></b>	<i>Prestasi substandard; Kegagalan adalah mengganggu dan mahal; gagal memenuhi kebanyakan keperluan peraturan dan fungsi; memerlukan pemantauan, pengubahsuaian atau penggantian berterusan. Kerja pemulihan atau penggantian menyeluruh diperlukan.</i>
3	<b><i>Sederhana Lemah</i></b>	<i>Gagal memenuhi keperluan peraturan dan fungsi dalam sesetengah kes; 'Gagal' merujuk kepada ketidakselesaan atau kerja pembaikan dan penyelenggaraan yang menyeluruh.</i>
4	<b><i>Mencukupi</i></b>	<i>Sebahagian kerja penyelenggaraan dan/atau pembaikan diperlukan.</i>
5	<b><i>Baik</i></b>	<i>Hanya memerlukan kerja-kerja pembaikan rutin yang kecil sahaja.</i>
6	<b><i>Amat Baik</i></b>	<i>Baru atau mudah dibaikpulih seperti keadaan "baru"; hanya memerlukan rutin penyelenggaraan yang minimal.</i>

1. Sistem/ciri-ciri bangunan sekolah dan keadaannya:

Bil.	Sistem/ciri-ciri bangunan sekolah	Amat Lemah	Lemah	Sederhana Lemah	Mencukupi	Baik	Amat Baik
a.	Atap/Bumbung	1	2	3	4	5	6
b.	Siling	1	2	3	4	5	6
c.	Lantai	1	2	3	4	5	6
d.	Struktur asas bangunan	1	2	3	4	5	6
e.	Dinding/kemasan luar	1	2	3	4	5	6
f.	Dinding/kemasan dalaman	1	2	3	4	5	6
g.	Tingkap	1	2	3	4	5	6
h.	Pintu	1	2	3	4	5	6
i.	Sistem Elektrik (Termasuk Pendawaian)	1	2	3	4	5	6
j.	Pencahayaan (Lampu)	1	2	3	4	5	6
k.	Pengudaraan/Kipas	1	2	3	4	5	6
l.	Sistem Perpaipan	1	2	3	4	5	6
m.	Sistem Bekalan Air	1	2	3	4	5	6
n.	Tandas	1	2	3	4	5	6
o.	Sistem Perparitan	1	2	3	4	5	6
p.	Sistem Kumbahan	1	2	3	4	5	6
q.	Keadaan sekolah secara keseluruhan	1	2	3	4	5	6

Sumber: Wisconsin Department of Public Instruction (1999), School Facility Survey  
US Department of Education (2012), Fast Response Survey System



**BAHAGIAN C: ISU-ISU PENYELENGGARAAN BANGUNAN SEKOLAH**

Bil.	Sistem/ciri-ciri bangunan	Penyelenggaraan yang mendesak di sekolah	Contoh visual (v)
a.	Atap/Bumbung		
b.	Siling		
c.	Lantai		
d.	Struktur asas bangunan		
e.	Dinding/kemasan luar		
f.	Dinding/kemasan dalaman		
g.	Tingkap		
h.	Pintu		
i.	Sistem Elektrik (Termasuk Pendawaian)		
j.	Pencahayaan (Lampu)		
k.	Pengudaraan/Kipas		
l.	Sistem Perpaipan		
m.	Sistem Bekalan Air		
n.	Tandas		
o.	Sistem Perparitan		
p.	Sistem Kumbahan		
q.	Kawalan Makhluk Perosak		

**BAHAGIAN D: DOKUMENTASI**

1.	School Document Files:		√	Notes
	1.1	School Strategic Planning <ul style="list-style-type: none"><li>• Development plan</li><li>• Maintenance plan</li></ul>		
	1.2	School Asset/Physical Development Committee <ul style="list-style-type: none"><li>• Committee members</li><li>• Minutes of meeting</li><li>• JPAK</li></ul>		
	1.3	School Development File <ul style="list-style-type: none"><li>• Projects (last 5 years)</li><li>• Source of project</li><li>• Sponsorship</li></ul>		

1.	School Document Files:		√	Notes
	1.4	Relevant Policy Documents <ul style="list-style-type: none"> <li>• School maintenance policy</li> <li>• JPAK</li> <li>• Pekeliling</li> <li>• 3K program</li> </ul>		
	1.5	Data of school building <ul style="list-style-type: none"> <li>• EMIS</li> <li>• MySpata</li> </ul>		
	1.6	School plan		

## Appendix 20: School Maintenance Organisation

### Appendix 20A: Summary of School Maintenance Organisation

No.	School Code	Organisation		Policy
		Unit/Committee	Membership	
1.	S01	Development & Maintenance Unit 3K Committee 5S Committee	Asst. Engineers Head Unit All Head Unit (workshop)	3K 5S
2.	S02	Development, Maintenance & Furniture Unit 3K Committee 5S Committee	Asst. Engineers Staff (PAR) Teachers PIC (Head Unit, Integrated Life Skills and Academic teachers)	3K 5S
3.	S03	Inventory, School Properties & Buildings Committee (3K and Quality Environment 5S)	School Admin Teachers Staff (Chief Clerk & Lab Asst.) Technician Sec. 5S Sec. 3K (H) Sec. 3K (S) Sec. 3K (B) Exco: PIC (Special room & Block)	3K 5S
4.	S04	3K Committee Board of Governor Development & Maintenance Committee	Teacher PIC	3K
5.	S05	3K Committee	Teacher PIC	3K
6.	S06	Asset Committee Development & Maintenance Committee 3K Committee	Technician	3K
7.	S07	Asset Committee 3K Committee	Teacher PIC	3K
8.	S08	School Physical Development Committee 3K Committee	Technician (Vacant)	3K
9.	S09	Development & Maintenance Committee 3K Committee	Teacher PIC	3K
10.	S10	3K Committee (HEM)	Teacher PIC	3K
11.	S11	Development & Maintenance Unit 3K Committee	Technician	3K
12.	S12	Development & Maintenance Unit 3K Committee 5S Committee	Asst. Engineers	3K 5S
13.	S13	Development & Maintenance Unit 3K Committee 5S Committee	Asst. Engineers	3K 5S
14.	S14	3K Committee	Staff PIC	3K
15.	S15	3K Committee	Teacher PIC	3K
16.	S16	Development & Maintenance Unit 3K Committee 5S Committee	Asst. Engineers	3K 5S
17.	S17	School Physical Development Committee 3K Committee	Teacher PIC	3K
18.	S18	School Physical Development Committee 3K Committee	Technician	3K

Notes:

PIC – Person In Charge

3K – Safety, Health & Beautification Programme

5S – Quality Environment Programme

## Appendix 20B: Responsibilities of Asset/Building Committee (S03)

1. Detect and identify damage to school buildings and hostels as well as determine priority in repairs
2. Identify needs or requirement of school field and courts, consequently take necessary action, especially when the field or court is required for use
3. Oversee the repair and renovation of school buildings, school field and courts
4. Check project status completion
5. Plan and implement school beautification program for school and hostels
6. Manage capital assets, including its repair and maintenance
7. Ensure that all school property is stored safely
8. Organise meetings minimum 2 times annually

## Appendix 20C: Job Description of Assistant Engineer (JA 29 Grade) Ministry Of Education Malaysia

### GENERAL WORK:

1. manage and take immediate action against any breakdowns and determine the method of damage repair work related to equipment and systems
2. managing and providing relevant technical equipment if necessary
3. manage the purchase of spare parts, craft and related equipment and services
4. prepare cost estimates and work specifications in the document quotes for repairs and maintenance in accordance with the plans and specifications
5. organise, supervise and oversee the implementation of the repair work , maintenance , and development of small projects according to plans and specifications
6. help provide a status report of the repair work , maintenance , small projects and those at the connection being established
7. help inspect and certify payment claims by the contractor in respect of the implementation of the repair work , maintenance , and development of small projects related
8. update documents related to repairs , maintenance , and development of small projects and record license registration and analysis of the performance of contractors contractor concerned
9. help create an annual plan for the provision of application maintenance and development of small projects related to the management

### Civil engineering domain:

1. receive complaint, conduct inspection work and maintenance repairs based on the inspections carried out and carry out regular maintenance of buildings and physical facilities
2. plan, supervise , manage and carry out works related to technical equipment, purchase of spare parts, carpentry, related equipment and services provide cost estimates
3. inspect, maintain and ensure the water tank, pipeline taps, sinks, flush, toilet pipes and sewage systems and septic sewage tank always functioning well
4. supervise and monitor the implementation of repairs, maintenance and small projects
5. help with job execution status report , updating documents related to repairs , maintenance, small projects and development projects
6. maintain and ensure the furniture in good condition and safe to use

Asset management/ maintenance (asset under control and care):

1. coordinate and supervise the aspects of management which the assets (reception, registration, use, storage, inspection, maintenance, disposal, loss and write-off )
2. coordinate and supervise the preparation of the statement of capital assets, inventory and disposal of government assets report
3. coordinate , supervise or carry out maintenance , repair, replacement and installation ( scope of work of civil / mechanical / electrical ) for both indoors and outdoors
4. help carry out forensic work for structural damage complaints or assist departments and agencies involved in the forensic investigation including site visits to make sure the date and other information related to the purposes of the investigation report on site
5. collect and provide information related to the post occupancy studies for projects that have been completed and handed over to customers for the purpose of benchmarking and continuous improvement

## Appendix 21: Summary of School Building Maintenance Request & Projects In Schools

### APPENDIX 21: SUMMARY OF SCHOOL BUILDING MAINTENANCE REQUEST & PROJECTS IN SCHOOLS

No.	School Code	Maintenance Projects Aspect	Year	Source
1.	S01	Feeder pillar, wiring (underground cable)	2013	MOE
		Emergency (hostel) : roof, ceiling, pipe	2013/14	MOE
		Rewiring, fence, flooring, roof, tennis court	2014	MOE
		Paint (school building, hostel, quarters)	2015	MOE
		Rewiring (Lighting, fan)	2015	School maintenance funds
		Hall roof	2015	School maintenance funds
2.	S02	Teachers' and girls' toilet	2015	School maintenance funds
		Prayer room (Extension area and roof)	2000	PTA
		Paint	2003	State Tithe Board
		Paint school building	2010	SED
		Upgrade classroom, computer lab, asbestos roof (metal deck)	2012/13	School
3.	S03	Roof, ceiling & painting (Quarters)	2013	MOE
		Roof, ceiling, toilets, septic tank, windows, painting (Dining Hall Hostel)		MOE (PRK2)
		Toilets (Academic blocks)		
		Air conditioner, fire extinguisher, septic tank hostel, quarters and school	2013	MOE
		Roller shutter, piping, toilets, roof, window frame, door	2014	MOE
		Pest, lighting, roof, floor, electrical rewiring, water pump, air conditioner, stair railing, chain link fence, toilet sink,	2014	MOE (PRK2)
		Field soil work	2014	OS28
		Metal door frame, plastic doors toilets	2015	OS31
		Refurbishment (Quarters)	2015	School maintenance funds OS28
		Slope maintenance, retaining wall, toilets maintenance, refurbishment, painting, field, badminton hall maintenance, classroom, canteen tiling, general maintenance (road and parking)	2012	MOE (PRK2)
4.	S04	Hall maintenance, maintenance of special rooms and electrical rewiring, field maintenance.	2012	MOE (PRK)
		Badminton hall maintenance, classroom lab workshop library and special room maintenance, electrical system maintenance.	2013	MOE (RMK10)



No.	School Code	Maintenance Projects Aspect	Year	Source
5.	S05	Canteen, toilets, health room, roof, guardhouse, counselling room, science lab refurbishment, teachers toilet, toilet door, electrical works, rain gutter, shed, paint, office, badminton hall. Road resurfacing. Toilet maintenance, prayer building, toilets and painting of prayer building. Teachers' room. Live skills workshop, ceiling replacement, toilet, water tank. School fence, sports courts, school hall (pest control, rewiring, paint toilets and roof), prayer area (electric and toilet), sewerage pump machine. Renovate the Assembly Pavilions Floor (Dormitory area) Hostel, toilets, doors, windows, roof, drain Roof (school building and hostel) Road resurfacing (hostel lane) Water tank Prayer room (repair work) Roof (school building and main hall), underground soil (underneath floor) and sewerage Air-conditioning service, fume hood, fire extinguisher service and sewerage Staff quarters (roof, door, lamp, toilet, electrical rewiring and plumbing) Request : 1. Crack of drain in certain block, snake habitat 2. Electrical wiring in block B 3. Toilet, Toilet window frame, Toilet door, Flushing system 4. Electrical supply, water supply, sewerage pump, termite, Water and fire hydrant, fence, gate, laboratory damage like tiles, window pane, table and chair, electrical, door, door knob	2014 2014 2011 2013 2015 2013 2013 2012 2012 2012 2013 2013 2013/14 2014 2014 2015 2015	MOE (PRK) Donation State Tithe Board MOE MOE Request MOE MOE MOE Donation MOE MOE (PRK) MOE MOE MOE MOE
6.	S06			
7.	S07			
8.	S08			
9.	S09			
10.	S10	IBS Building: 1. Toilet ceiling (water leak) 2. Cracked drain 3. Toilet 4. Wall 5. Foyer socket	2011	MOE

No.	School Code	Maintenance Projects Aspect	Year	Source
11.	S11	Sewerage, electrical wiring, road resurface, basketball court	2013	MOE
		Meeting room, fence, guard house, roof, gutter & school road light	2013	PTA
		Toilet, damaged tiles & door	2014	MOE (PRK)
		School building paint	2014	MOE
12.	S12	n.a.	n.a.	n.a.
13.	S13	Request : 1. Grill door, window, door, door knob, classroom, toilet door, tab, electric and air conditioning. Hostel : water tap, door paint, fan, fire hydrant, electrical Hall : fan, bulb, electrical rewiring, exhaust fan, roof and drain 2. Special maintenance programme: USNT quarters (roof, plumbing & water tank) 3. Budget (MKRA) OS28 & OS32 Hostel: Electrical & Stair Prayer building 4. Fire extinguisher (school and hostel) Fire prevention system 5. Maintenance & Improvement: Air conditioning, main motor pump, road, lighting & spotlight, pump house, NT hostel, paint 6. Special maintenance programme(quarters): Sewerage system Plumbing system & water tank Electrical wiring Paint Roof Door, window, washroom and toilet 7. Electric (school & hostel) Office partition Repair quarters 8. OS28: replace classroom door and float ball for toilet, roof leak, pipe leak & toilet door. 9. OS28: teachers'/students' toilet, door and plumbing system (academic block) & electrical wiring	2015	MOE
			2015	MOE
			2015	MOE
			2015	MOE
			2015	MOE
			2015	MOE (PRK)
			2012	MOE
			2012	MOE
			2012	MKRA

No.	School Code	Maintenance Projects Aspect	Year	Source
		10. Water pump Paint main hall	2012	MKRA Corporate
		11. Sewerage, paint, water tank and pipe, fireguard & rewiring.	2013	MOE
		12. Guard house, new fence & hall (roof, lighting and fan)	2015	MOE
14.	S14	Financial assistance: repair hall and toilet	2014	Minister of Education
		Extension building (guest room)	2015	PTA
15.	S15	Hamidah Religious Center	2015	Corporate (YAB)
		Request:		
		1. Hall and Life Integrated Skill Workshop	2013	MOE
		2. Electrical rewiring, lighting, fans, electrical socket, earth cable	2015	MOE
		3. Roof and ceilings	2015	MOE
		4. Trees trimming & clearing of school area	2015	MOE
16.	S16	Electrical wiring (hostel), toilet in academic block and hostel	2012	MOE
		Sewerage (service, repair and replace the motor)	2014	MOE
		All toilets in academic block (toilet door, water tap, flush handle, pipe and door lock).	2015	MOE
17.	S17	Fence – brick wall	2009	MOE
		Air conditioning	2014	MOE
18.	S18	Electrical wiring on all academic block, main hole for sewerage		
		Fire extinguisher		
		Pump motor (water tank)		
		Returf hockey field		
		Anti-climb fence, Y chain link fence		
		Wall fence		
		Paint main & hostel fence		
		21 <sup>st</sup> century classroom (tile)	2015	MOE

**NOTES:**

MOE : Ministry of Education Malaysia

SED : State Education Department

MKRA : Minister's Key Result Area

PRK : Special Stimulus Package

PRK2 : Special Stimulus Package 2

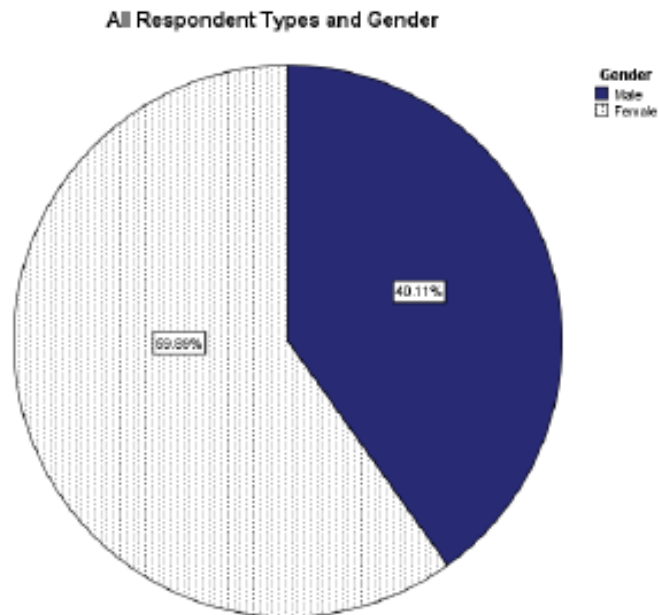
## Appendix 22: School Complaint Form S08 (Sample)

<b>PERMOHONAN PENYENGGARAAN</b> ( Diisi dalam 2 salinan dan diserahkan kepada Pengetua ) <b>BUTIRAN PEMOHON</b>		
<b>NAMA :</b> _____		
<b>NO. TEL BIMBIT :</b> _____		
<b>BUTIRAN KEROSAKAN:</b> <input type="checkbox"/> Infrastruktur <input type="checkbox"/> Peralatan <input type="checkbox"/> Kenderaan		
<b>LOKASI:</b> Jenis Kerosakan : (Nyatakan butiran kerosakan)		
<div style="text-align: right;">                         Tandatangan Pemohon                          Tarikh : _____                     </div>		
(Sila sertakan lampiran sekiranya ruang tidak mencukupi)		
Tindakan Juruteknik J17		
Bil	Kategori Kerosakan	Tandakan (✓)
a	Kerosakan yang boleh dibaiki terus	
b	Kerosakan yang boleh dibaiki tetapi memerlukan alat ganti	
c	Kerosakan yang perlu dibaiki oleh pembekal / kontraktor luar	
d	Kerosakan yang tidak ekonomi untuk dibaiki	
<b>Ulasan pemeriksa</b>		
<div style="text-align: right;">                         Tandatangan (Juruteknik J17)                          Nama:                          Tarikh:                     </div>		
ULASAN PEMBANTU TADBIR (KEWANGAN)		
Pecahan kepala		Tandatangan dan Tarikh
Baki Peruntukan Semasa		
PERAKUAN DAN KELULUSAN KETUA JABATAN		
Permohonan di atas :  <b>DILULUSKAN/ TIDAK DILULUSKAN</b>		Tandatangan dan cop Pengetua Tarikh:
ARAHAN KERJA KEPADA JURUTEKNIK		
(Juruteknik J17)	Tarikh Arahkan Kerja	Catatan :
1) _____	1) _____	
2) _____		

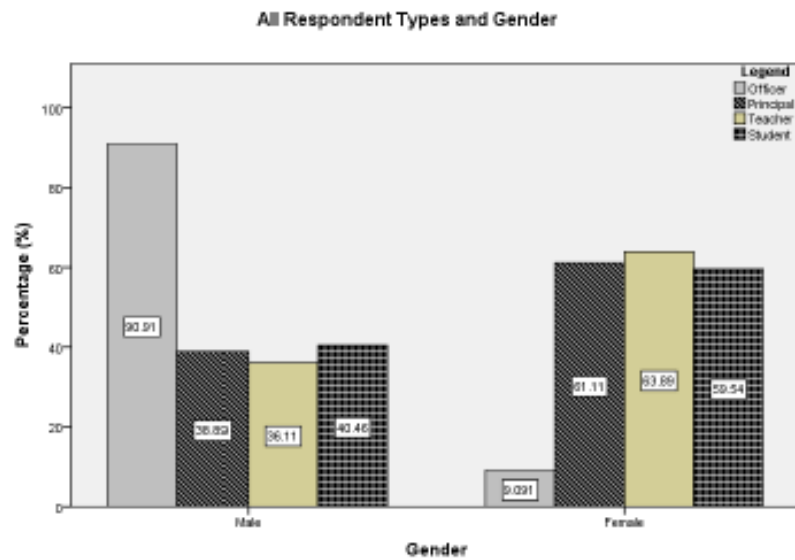
## Appendix 23: Survey Demographics

### Appendix 23A: Survey Demographic (Gender)

#### a) Gender composition of all respondents:

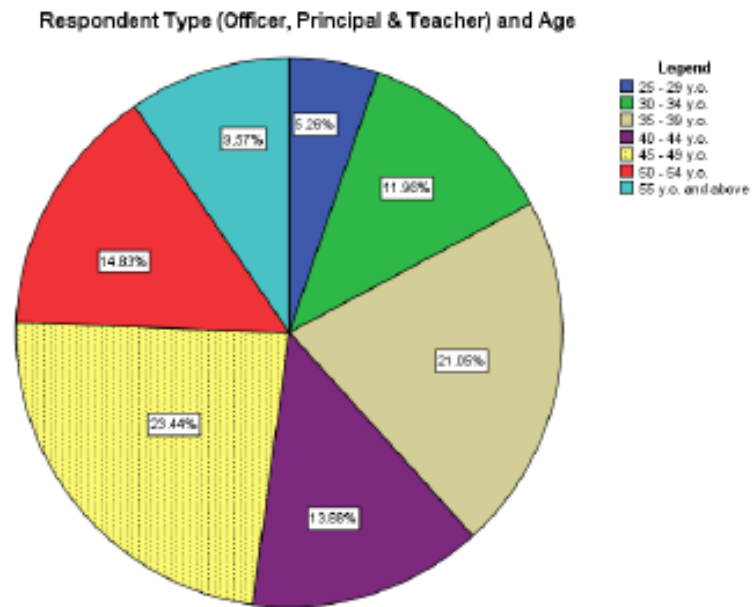


#### b) Gender composition according to respondent type:

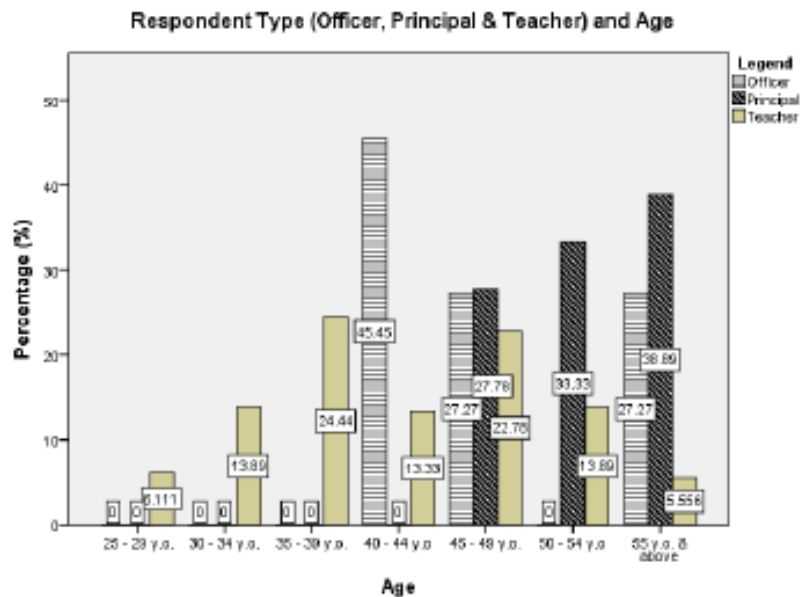


## Appendix 23B: Survey Demographic (Age)

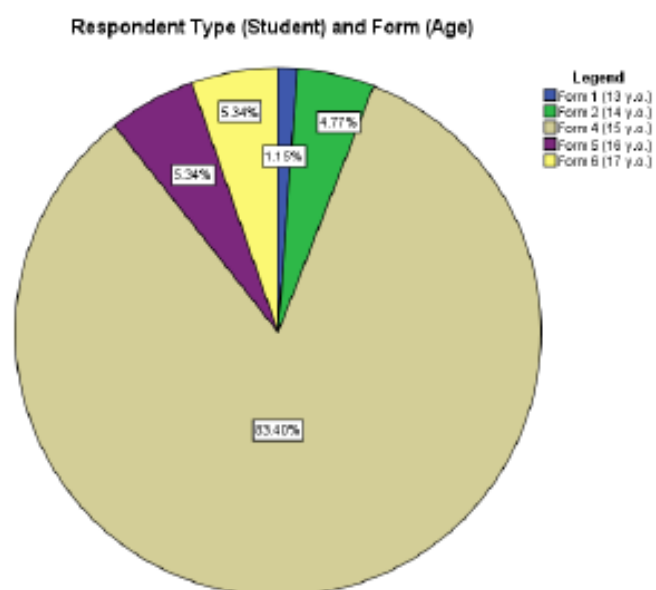
### a) Age composition of adult respondents:



### b) Age composition of adult respondents according to respondent type:

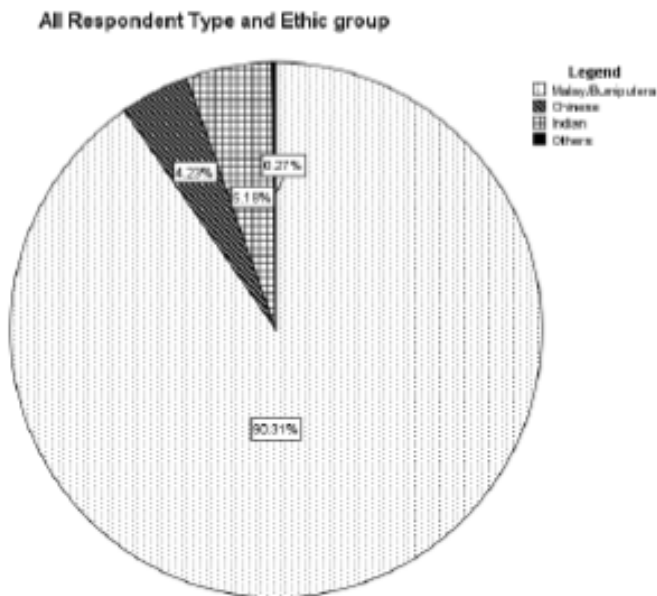


c) Age composition of students:

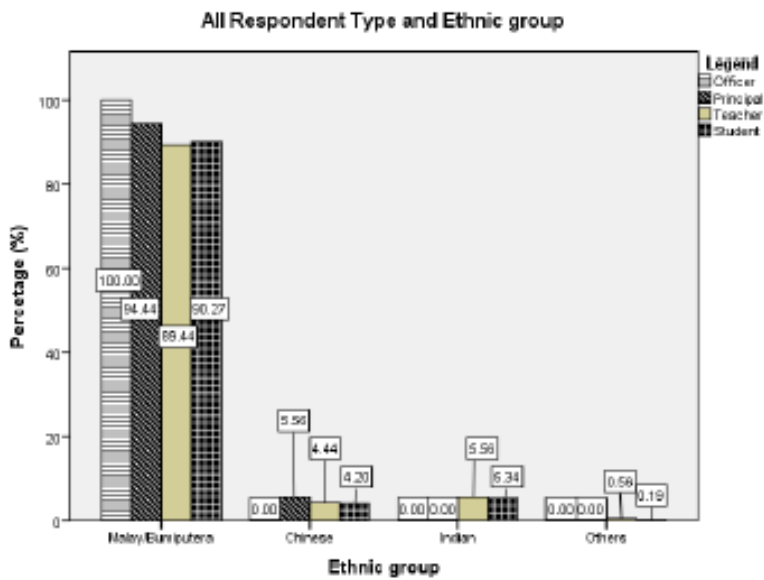


Appendix 23C: Survey Demographic (Ethnicity)

a) Ethnic composition of all respondents:



b) Ethnic composition according to respondent type:

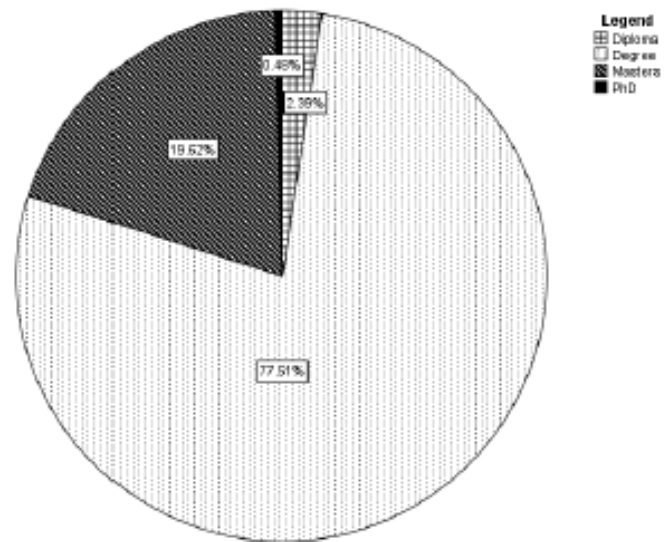




## Appendix 23D: Survey Demographic (Qualification)

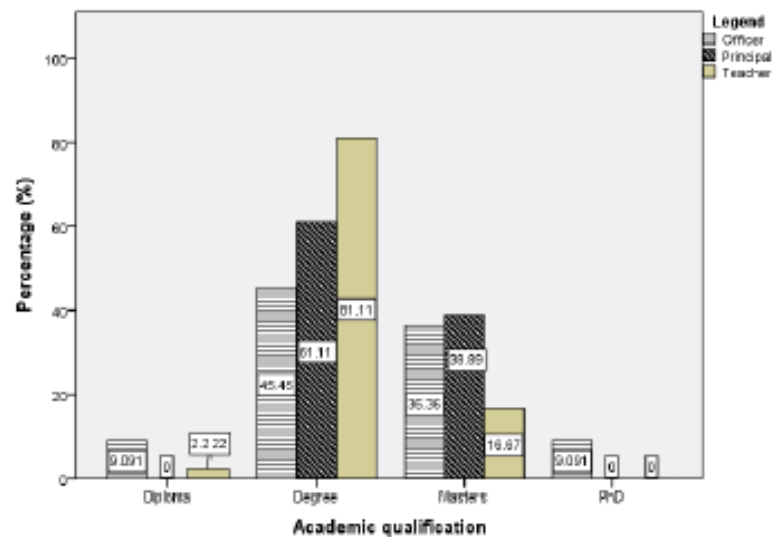
### a) Qualification of adult respondents:

Respondent Type (Officer, Principal and Teacher) and Qualification



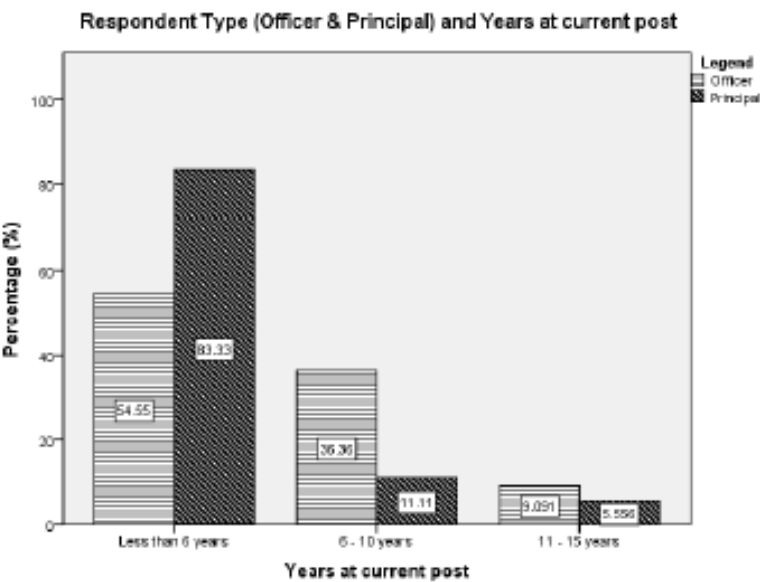
### b) Qualification according to respondent type:

Respondent Type (Officer, Principal & Teacher) and Qualification



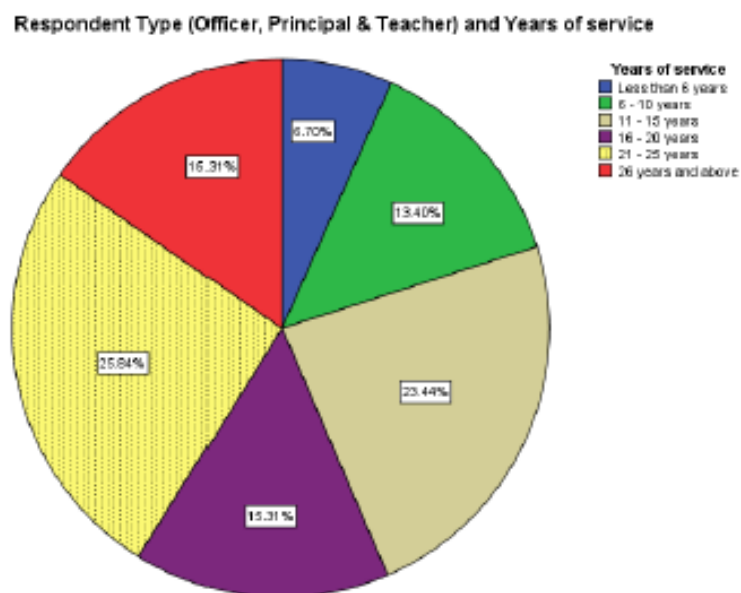
Appendix 23E: Survey Demographic (Years at current post)

a) Years at post of adult respondents (Officer and school leader):

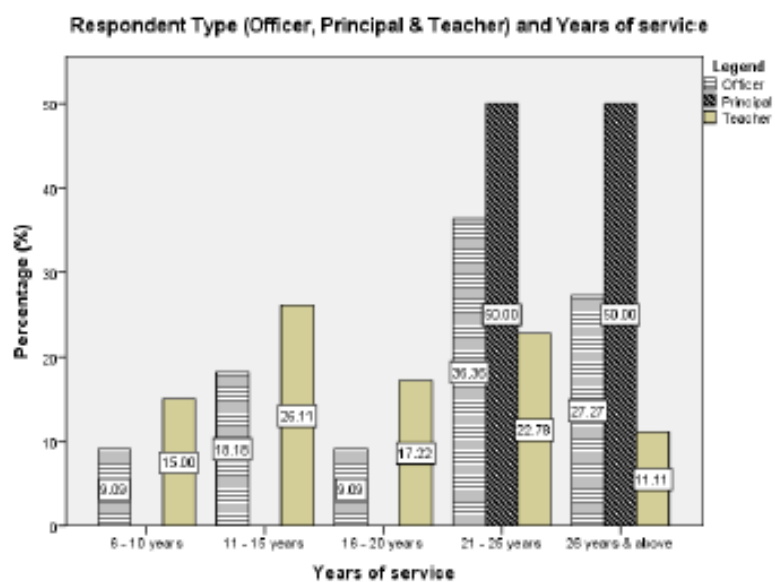


## Appendix 23F: Survey Demographic (Years of service)

### a) Years of service of adult respondents:

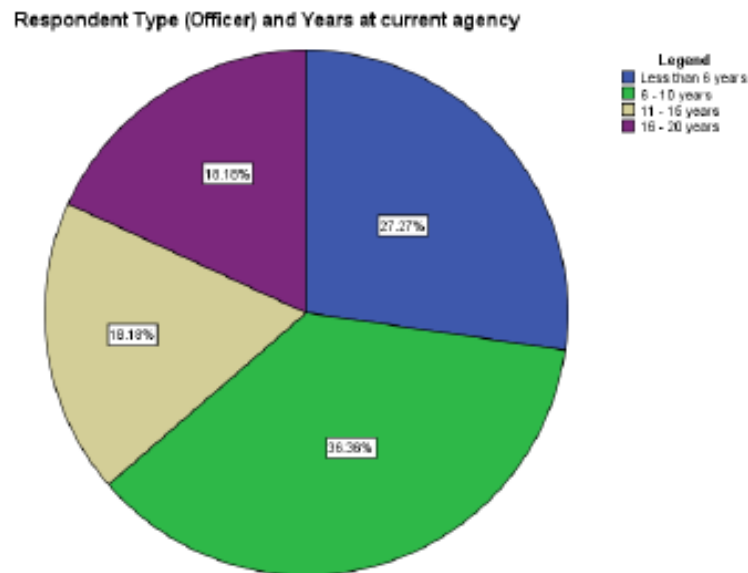


### b) Years of service of according to respondent type:

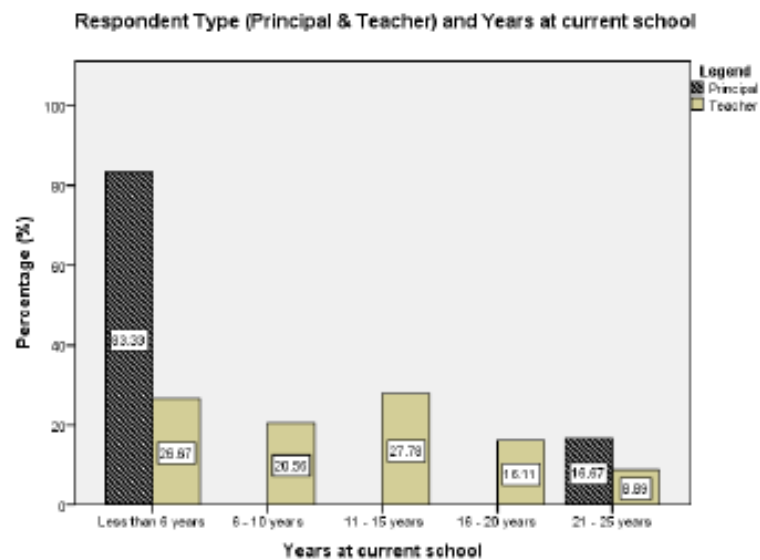


Appendix 23G: Survey Demographic (Years at current agency/school)

a) Years at current department (Officer):

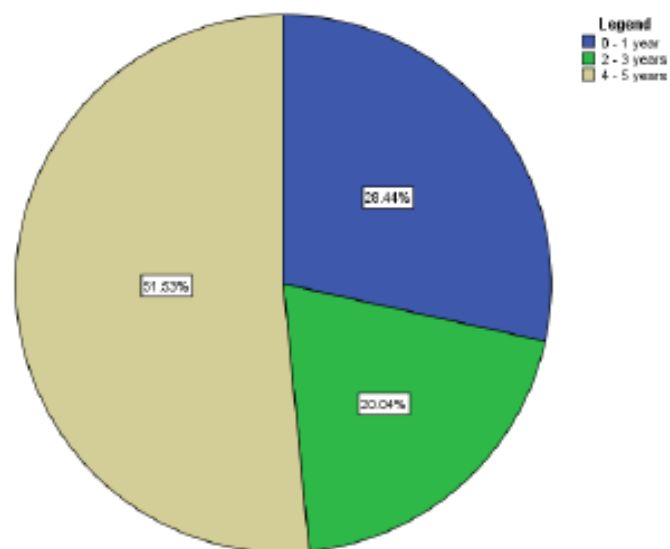


b) Years at current school (School leader and teacher):



b) Years at current school (student):

Respondent Type (Student) and Years at current school

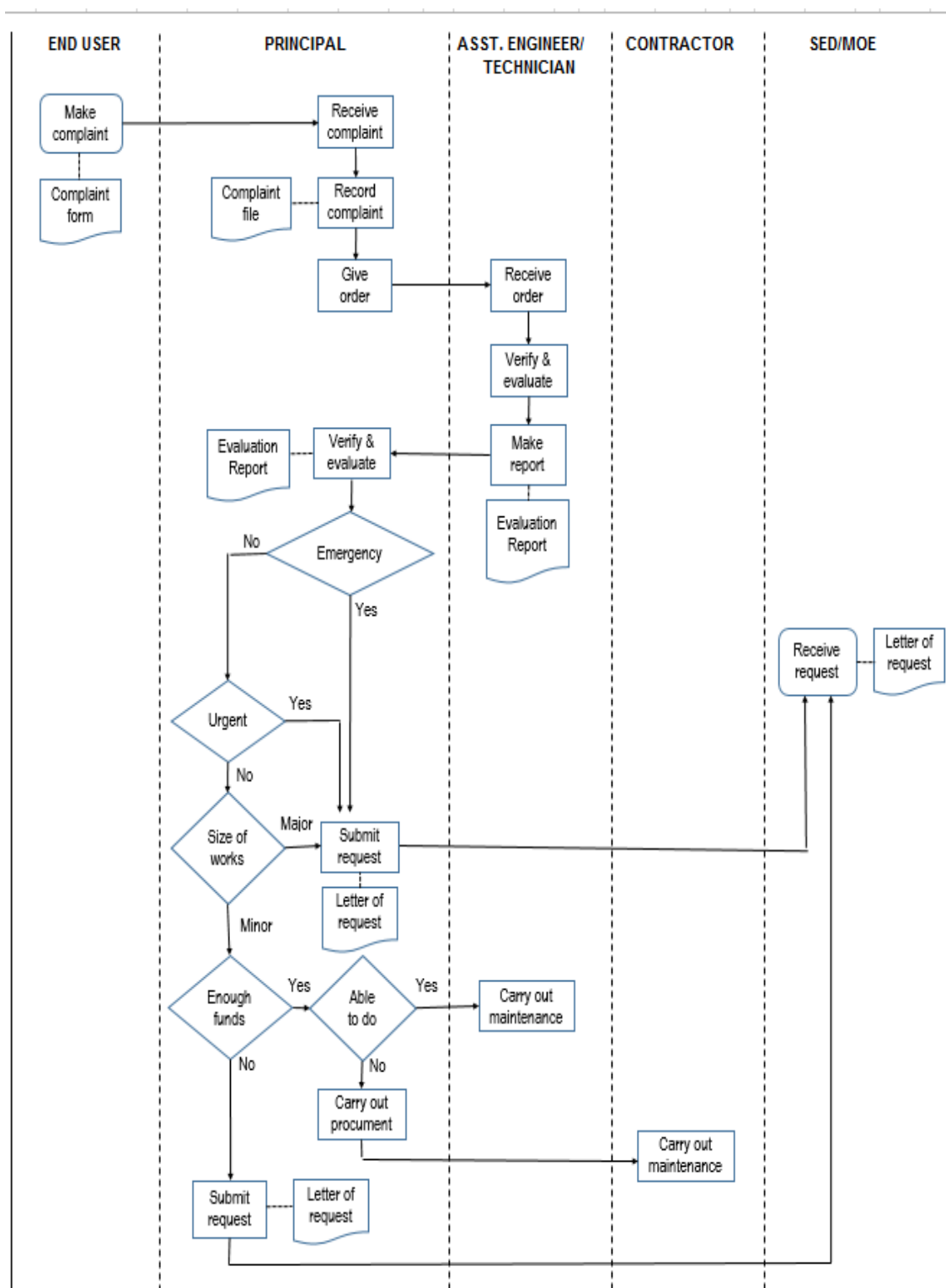


## Appendix 24: Impact of Maintenance on Feelings and Emotions

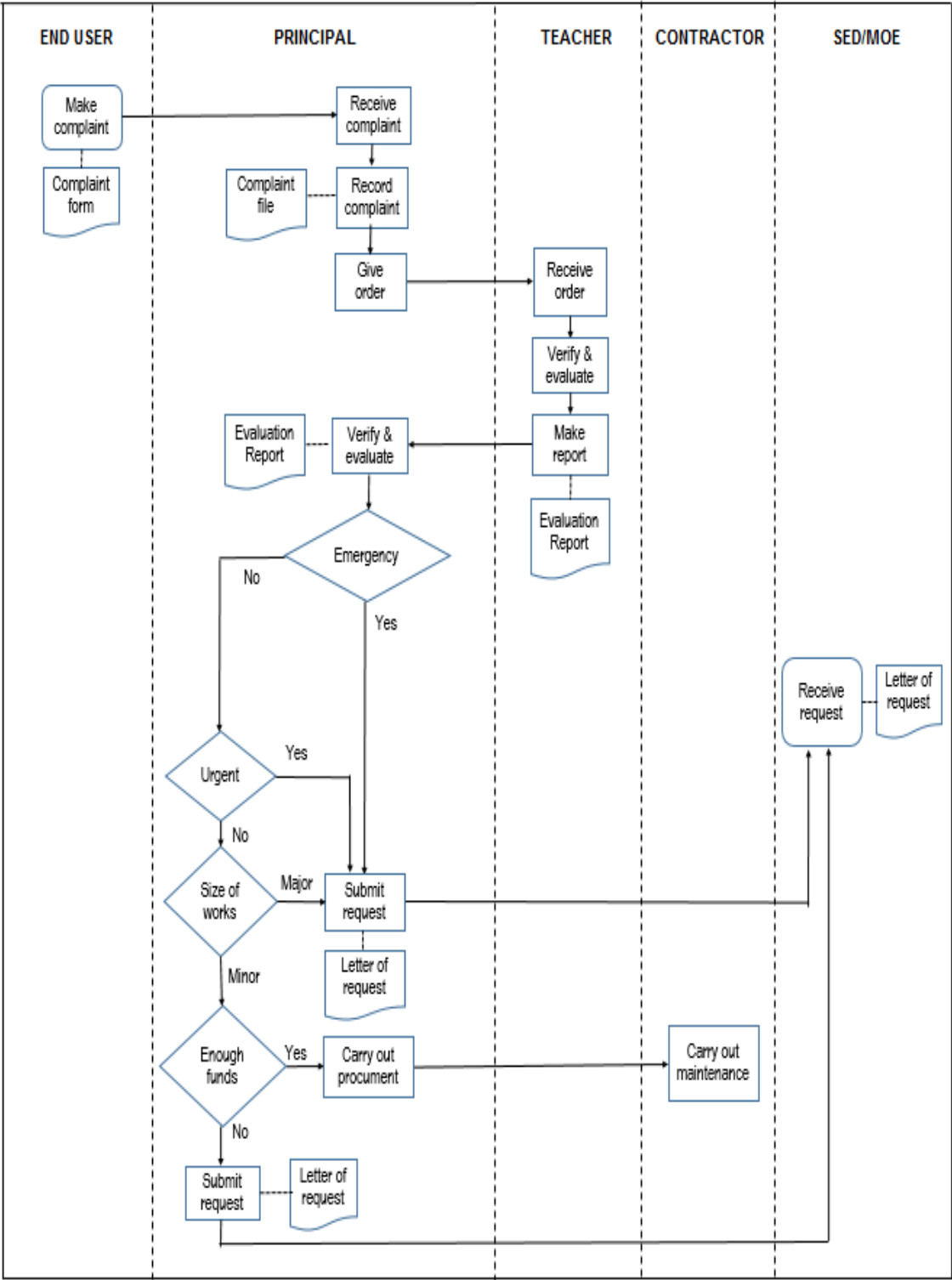
Respondent	Reactions: Feelings and Emotions	
	Positive	Negative
Officer		worried (Neil, A5)
Principal		It [school building maintenance issue] is a headache (Gabriella, S14)
Teacher		Joy - Decrease motivation & excitement (Abraham, S10)
Student	okay (Brad S03)	Annoyance - fed up (Brad, S03)
	grateful (Ben, S03)	Surprise - surprise (Bryan, S03)
	comfortable enough, more than comfortable (Brad, S03)	affects our motivation to study for the prep class (Brooke, S03)
	affects mood to study (Alan, S01)	affects our motivation to study (Brad, S03)
	beautiful, cheerful toilets which would make us more comfortable (Amy, S01)	Annoyance - we tend to be fed up with the situation [fans not working](Brad, S03)
	make us comfortable and easier to learn... we can focus more (Alex, S01)	Sadness - There is a feeling of disappointment. Apprehension - Feeling worry. Feeling guilty too. (Eric, S09)
		Fear - Because if we report to the teacher, he might be angry with us because we could appear to be complaining a lot. (Eric, S09)
		Anger - The students are angry that the water pump was not replaced. (Eric, S09)
		Do I want to go? Do I want to go? Like that. The mind feels numb. Because the moment we need to go most probably is the time the teacher is teaching us. Maybe we would have been left behind a bit on what has been taught (Eve, S09)

## Appendix 25: Maintenance Processes and Procedures

### Appendix 25A: Vocational & Residential Schools



Appendix 25B: National & Religious Schools





## Appendix 26: Maintenance-Related Policies In Malaysia

### A) Federal:

1. General Order (Government of Malaysia):
  - a. Asset management:
    - i. Chapter E Item 25a
  - b. Maintenance:
    - i. Pekeliling Am Bil. 1/2009 Manual Pengurusan Aset Menyeluruh Kerajaan Malaysia
    - ii. Pekeliling Am Bil. 2/1995 Pengurusan Penyelenggaraan
    - iii. Pekeliling Am Bil. 2/2012 Tatacara Pengurusan Aset Tak Alih (TPTA)
2. Legislations and Regulations related to Malaysian Government Procurement (Adham and Siwar, 2012):
  - a. Financial Procedure Act 1957 (Revised 1972)
  - b. Ministerial Functions Act 1969
  - c. Government Contract Act 1949
  - d. Treasury Instructions (Ministry of Finance, 2004)
  - e. Treasury Circulars
  - f. Treasury Instruction Letters
  - g. Federal Central Contract Circulars
3. Malaysia national education blueprint (Malaysia Education Blueprint 2013-2025)
4. Malaysia National Development Plan (Malaysia Plan)

### B) Educational:

1. Professional Circular:
  - a. SPI Bil. 15/1988 Penyelenggaraan dan keceriaan Maktab Perguruan/Politeknik/Sekolah (Maintenance of teaching training college/polytechnic/school)
  - b. SPI Bil. 4/2002 Pelaksanaan program sekolah selamat (Safe schools programme implementation)
  - c. SPI Bil. 7/2000 Pencegahan kebakaran di sekolah (Fire prevention in schools)

All building maintenance and related engineering services are subjected to the following legislations, regulations and directives in force such as (Zakaria et al. 2010):

1. Uniform Building By-Laws 1984
2. Occupational Safety and Health Act 1994: Act 514
3. Electricity Supply Act 1990: Act 447
4. Electricity Regulations 1994
5. Fire Services Act 1988: Act 331
6. Street, Drainage and Building Act 1974
7. Sewerage Act 1994
8. Industrial Code of Practice on Indoor Air Quality 2010
9. Factories and Machines Act (Amendment) 2006: Act A1268
10. Solid Waste Management Act 2007: Act 672
11. Malaysian Standards (wherever relevant)
12. Local Authorities by laws

**Appendix 27: Other Annual Recurrent Expenditures/ Other Special Expenditures (Finance Division, 2010)**

**Rate (Formula)**

1.	Other Annual Recurrent Expenditures (LPBT)/ Other Special Expenditures (LPK)					
	1.1	Secondary school/ government aided religious school	MYR 5000	MYR 5000 + MYR 49 per student exceeding 100 students	MYR 24600 + MYR 48 per student exceeding 500 students	MYR 48600 + MYR 47 per student exceeding 1000 students
	1.2	Fully residential school/Sports school/Art school	MYR 62 per student per year			
	1.3	Technic/Vocational secondary school	MYR 76 per student per year			
2.	Per capita grant (Hostel): Rate					
	2.1	Other Annual Repetitive Expenditures (LPBT) Other Special Expenditures (LPK) Hostel (Daily hostel/ Fully residential school)	MYR 60 per student per year			

**List of usage**

Other Annual Recurrent Expenditures (LPBT)/ Other Special Expenditures (LPK) for School/Hostel	
i.	Payment of telephone, water, electricity, stamps, internet and sewerage. (Schools should priorities the payment of utilities bill)
ii.	Minor school buildings repairs that doesn't involve upgrading and renovation works.
ii.	Maintenance and furniture repair and office and school equipment except ICT equipment.
iv.	Printing services for the school management and teaching and learning materials.
v.	Advertising services.
vi.	Transportation of goods.
vii.	Purchase of petrol, consumables and medicines.
viii.	Expenses for entertainment that involves external visitors on official business.
ix.	Expenses for beautification of school (not involving construction)/ students' health/ school safety.
x.	The acquisition of capital assets except air conditioning and ICT equipment with a total value not exceeding RM5 million per year are permitted.
xi.	Reimbursement for emergency matters by teachers / school staff based on entitlement of cab fare.
xii.	Student transportation and insurance costs for students and accompanying teachers.

Appendix 28: Malaysian Education Ecosystem And Malaysia Education Blueprint 2013-2025 (<http://www.padu.edu.my/meb>)



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